AMERICAN SCHOOL AND UNIVERSITY

1961-62

Thirty-third edition

EDUCATIONAL PURCHASING GUIDE
AND PLANT REFERENCE

371.6
Am3
1961-62

Buttenheim Publishing Corporation
470 Park Avenue South New York 16, N. Y.

published by

Buttenheim Publishing Corporation

New York

This 1961-62 edition is different

You'll find the same high quality and quantity of unique editorial matter in this, the 33rd consecutive edition of AMERICAN SCHOOL AND UNIVERSITY. Two changes represent our effort to add to its reading and reference value:

1. We've deliberately tried to get important help in each of the many categories of interest and responsibility of those who look after educational plant needs. For example, see Plant Manager Tonigan's bibliography for those teaching and working in this field. Or again the symposium on purchasing furniture and equipment from four long experienced suppliers.

2. We've organized our material so that each editorial section is followed by catalog-type listings appropriate to the subject. Dean Colbert's exciting tour of the planning process for a new-type teaching-auditorium, for example, is followed by the catalogs of auditorium, theater and related suppliers.

Two features which have been highly popular and helpful are continued. ASU's own research of educational construction in 1960 opens our editorial section. The five-year index which has always added to the value of any single volume has again been brought up to date. The field is so broad that reasonably full coverage is possible to only a small part each year. The index is our way of extending this coverage.

Miss Manla carries the major editorial responsibility as she has so effectively in the past. But this is the place for us to say thank you, for ourselves and our readers, to the many leaders in the field who have contributed so generously to this edition and to all our publications.

Many of our readers read this book from cover to cover. Others dip in as time permits. The new format should help either group.

Your comments and suggestions for continued improvement will be welcome, as always.

Archibald B. Shaw, *Editor*

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Schoolco, Inc. F-1/Be
Simmons Co. J-3/Si
Toledo Metal Furniture Co. K14

Chairs—Tablet Arm

BeLa Div., J & J Tool and Machine Co. F-1/JJ
Brunswick Corp. F24
Chicago Hardware Foundry Co., The J9
Durham Mfg. Corp. F28
Heywood-Wakefield Co. F-1/He
Schoolco, Inc. F-1/Be
Shwayder Bros., Inc. F29

Chalkboard Frames, Trim (see Mountings)

Chalkboards

Brunswick Corp. F24
Claridge Products and Equipment Inc....B17
Hamilton Mfg. Co. J-1/Ha
Pennsylvania Slate Producers Guild, Inc. B18
Schoolco, Inc. F-1/Be

Check Room Equipment (see Racks—Clothing)

Checks—Door (see Closers)

Chests—Clothing

Royal Metal Mfg. Co. J-3/Ro
Simmons Co. J-3/Si
Superior Sleeprite Corp. J28, 29

Chopping Machines—Food

Triumph Mfg. Co., The J24

Choral Stands (see Stands—Band, Choral, etc.)

Chucks

Brown & Sharpe Mfg. Co. G27
Logan Engineering Co. G34

Circuit Breakers

Adam Electric Co., Frank H-2/Ad
Graybar Electric Co., Inc. C32

Circuit Selector Panels (see Panels—Lighting Control)

Clamps—Chair (see Chair Accessories, Attachments)

Classroom Furniture (see Furniture—Classroom)

Cleaners—Floor

Finnell System, Inc. M9
Hillyard Chemical Co. M18
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12

Climbing Apparatus

Ever-Wear D11
Trojan Playground Equipment Mfg. Co. D12

Clocks

Simplex Time Recorder Co. C34, 35

Clocks—Program

Graybar Electric Co., Inc. C32
Montgomery Mfg. Co., Inc. C33
Simplex Time Recorder Co. C34, 35

Closers—Door

Norton Door Closers B20

Coat and Hat Racks (see Racks—Clothing)

Collets

Brown & Sharpe Mfg. Co. G27

Colorimeters

Klett Mfg. Co. G23

Communication Systems (see Intercommunication Systems)

Compartments—Toilet (see Partitions)

Conduit—Electrical

Laclede Steel Co. A9

Containers—Waste

Bennett Mfg. Co., Inc. M16

Cooking Units

Dwyer Products Corp. J27
Hubbert & Son, Inc., B. H. J21

Coolers—Beverage

Jordon Commercial Refrigerator Co. J22
Puffer-Hubbard Refrigerator Co. J23

Coolers—Cold and Hot Water

Cordley and Hayes C23

Coolers—Drinking Water

Century Brass Works, Inc. C-3/Ce

Coolers—Water, Electric

Century Brass Works, Inc. C-3/Ce
Cordley and Hayes C23
Filtrine Mfg. Co. C-3/Fi
Taylor Co., The Halsey W. C25
Victory Metal Mfg. Corp. J26

Coping

Natco Corp. B12
Pennsylvania Slate Producers Guild, Inc. B18

Corkboard (see Bulletin Boards)

Cots—Folding

Superior Sleeprite Corp. J28, 29

Counter Tops (see Surfacing)

Counters—Cafeteria

Van Range Co., The John J20

Curtain Tracks and Controls (see Tracks—Curtain, Window)

Curtain-Walls

Bayley Co., The William A15
Inland Steel Products Co. A13
Marmet Corp. A18
Michaels Art Bronze Co., The B22

Curtains—Stage

Forse Mfg. Co. A19
Novelty Scenic Studios, Inc. H-2/No

Curtains—Window

Forse Mfg. Co. A19
Novelty Scenic Studios, Inc. H-2/No

Custodian Supplies and Equipment

Clarke Floor Machine Co. M8
Finnell System, Inc. M9
General Floorcraft, Inc. M10
Hild Floor Machine Co., Inc. M-1/Hi
Holt Mfg. Co. M11
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12
Pullman Vacuum Cleaner Corp. M13
Spencer Turbine Co., The M14
United Floor Machine Co., Inc. M15

Cutters—Milling

Brown & Sharpe Mfg. Co. G27

Cycloramas

Forse Mfg. Co. A19
Novelty Scenic Studios, Inc. H-2/No

Data Processing Equipment

National Cash Register Co., The K13

Deck—Steel

Macomber A10

Demineralizers—Water

Barnstead Still & Sterilizer Co. G21

Desk, Chair—Combination

BeLa Div., J & J Tool and Machine Co. F-1/JJ
Brunswick Corp. F24
Heywood-Wakefield Co. F-1/He
Schoolco, Inc. F-1/Be

Desk Cups

Faultless Caster Corp. F25

Desk Tops (see Surfacing)

Desks—Dormitory

Royal Metal Mfg. Co. J-3/Ro
Simmons Co. J-3/Si
Superior Sleeprite Corp. J28, 29
Western Mfg. Co. F26

Desks—Instructor, Library, Office

Brunswick Corp. F24
Duralab Equipment Corp. G-1/Du
Hamilton Mfg. Co. J-1/Ha
Lyon Metal Products, Inc. F32, 33
Metalstand Co. F27
Royal Metal Mfg. Co. J-3/Ro
Western Mfg. Co. F26

Desks—Laboratory (see Furniture—Laboratory)

Desks—Secretary, Typing

Brunswick Corp. F24
Metalstand Co. F27
Royal Metal Mfg. Co. J-3/Ro
Toledo Metal Furniture Co. K14

Desks—Sewing

Singer Sewing Machine Co. G38

Desks—Student

BeLa Div., J & J Tool and Machine Co. F-1/JJ
Brunswick Corp. F24
Heywood-Wakefield Co. F-1/He
Schoolco, Inc. F-1/Be
Toledo Metal Furniture Co. K14

Desks—Tablet Arm (see Chairs)

Desks—Wall-Hung
Ames Co., W. R. B16

Destructors (see Incinerators)

Detergents (see Cleaners—Floor)

Dial Indicators
Starrett Co., The L. S. G36

Die Sinking Machines
Cincinnati Milling Machine Co., The G32, 33

Dimmers
Adam Electric Co., Frank H-2/Ad
Century Lighting, Inc. ..... HB, 9
Kliegl Bros. H10, 11

Dinnerware
Keyes Fibre Co. J11

Directory Boards
Architectural Bronze & Aluminum Corp. B21
Michaels Art Bronze Co., The B22

Dish, Glass & Silver Washing Machines
Universal Dishwashing Machinery Co. J25

Dishes—Paper
Keyes Fibre Co. J11

Dishes—Plastic
Keyes Fibre Co. J11

Disposals—Waste (see Incinerators)

Door—Hardware (see Hardware—Door)

Door Closing Devices (see Closers—Door)

Door Operators—Automatic
Norton Door Closers B20

Doors—Aluminum
Marmet Corp. A18
Michaels Art Bronze Co., The B22

Doors—Bronze
Michaels Art Bronze Co., The B22

Doors—Coiling (see Partitions—Coiling)

Doors—Folding (see Partitions—Folding)

Doors—Steel, Stainless
Michaels Art Bronze Co., The B22

Dormitory Furniture (see Furniture—Dormitory

Drapery (see Curtains)

Drawers
Lyon Metal Products, Inc. F32, 33

Drawing Boards
Stacor Equipment Co. H13

Drill Presses
Atlas Press Co., Clausing Div. G28, 29
Cincinnati Lathe and Tool Co. G30
Duro Metal Products Co. G31

Drilling Machines—Turret
Brown & Sharpe Mfg. Co. G27

Drills—Twist
Brown & Sharpe Mfg. Co. G27

Dryers—Electric (Hand, Hair)
American Dryer Corp. M17
Chicago Hardware Foundry Co., The J9
Huntington Laboratories, Inc. M-4/Hu

Electronic Training (see Training Programs)

Enclosures—Playground
Anchor Fence Div., Anchor Post Products, Inc. D7
Colorado Fuel and Iron Corp., The D-1/Co
Cyclone Fence Dept., United States Steel D8

Enclosures—Tennis Court
Anchor Fence Div., Anchor Post Products, Inc. D7
Colorado Fuel and Iron Corp., The D-1/Co
Cyclone Fence Dept., United States Steel D8

Erasers—Chalk
Schoolco, Inc. F-1/Be

Fans
Graybar Electric Co., Inc. C32

Fencing—Chain Link
Anchor Fence Div., Anchor Post Products, Inc. D7
Colorado Fuel and Iron Corp., The D-1/Co
Cyclone Fence Dept., United States Steel D8

Files (see Cabinets—Filing)

Filing—Open Shelf
Borroughs Mfg. Co. F30

Fire Alarms
Graybar Electric Co., Inc. C32
Simplex Time Recorder Co. C34, 35

Fire Protection (see Sprinkler Systems)

Fixtures—Architectural Lighting
Pistol, Inc., A. W. C-5/Pi

Fixtures—Lighting, Fluorescent
General Lighting Co. C27
Graybar Electric Co., Inc. C32
Guth Co., The Edwin F. C30
Holophane Co., Inc. C28, 29

Fixtures—Lighting, Incandescent
General Lighting Co. C27
Graybar Electric Co., Inc. C32
Guth Co., The Edwin F. C30
Holophane Co., Inc. C28, 29
Kliegl Bros. H10, 11
Pistol, Inc., A. W. C-5/Pi

Fixtures—Lighting, Mercury Vapor
Holophane Co., Inc. C28, 29

Flag Poles
Trojan Playground Equipment Mfg. Co. D12

Floodlighting (see Lighting—Flood)

Floor Coverings (see Tile)

Floor Finishes
Finnell System, Inc. M9
Hillyard Chemical Co. M18
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12

Floor Finish Removers (see Removers—Floor Finish)

Floor Maintenance Machines—Scrubbing, Waxing, Sanding, Polishing, etc.
Cassidy Products, Inc. M7
Clarke Floor Machine Co. M8
Finnell System, Inc. M9
General Floorcraft, Inc. M10
Hild Floor Machine Co., Inc. M-1/Hi
Hillyard Chemical Co. M18
Holt Mfg. Co. M11
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12
Pullman Vacuum Cleaner Corp. M13
United Floor Machine Co., Inc. M15

Floor Treatments (see Cleaners—Floor and Floor Finishes)

Flooring—Abrasive
American Abrasive Metals Co. B8, 9
American Mason Safety Tread Co. B7
Wooster Products, Inc. B11

Flooring—Steel
Inland Steel Products Co. A13

Flooring—Tile (see Tile)

Fluorimeters
Klett Mfg. Co. G23

Food Preparation Equipment
Hubbert & Son, Inc., B. H. J21
Triumph Mfg. Co., The J24
Van Range Co., The John J20

Food Service—Mobile (see Trucks—Food Service)

Food Warmers
Crescent Metal Products, Inc. J-2/Cr
Van Range Co., The John J20
Victory Metal Mfg. Corp. J26

Footlights (see Lighting—Foot)

Fountains—Drinking
Cordley and Hayes C23
Filtrine Mfg. Co. C-3/Fi
Taylor Co., The Halsey W. C25

Framing—Building (see Building Construction)

Framing—Steel
Laclede Steel Co. A9
Macomber A10

Freezers
Jordon Commercial Refrigerator Co. J22
Puffer-Hubbard Refrigerator Co. J23
Victory Metal Mfg. Corp. J26

Fume Ducts—Chemical
Knight Co., Maurice A. G20

Fume Hoods—Chemical
Duralab Equipment Corp. G-1/Du
Hamilton Mfg. Co. J-1/Ha
Laboratory Furniture Co., Inc. G-1/La
Metalab Equipment Co. G-1/Me

Fund-Raising
American City Bureau K15

Furniture—Art Room
Metalab Equipment Co. G-1/Me
Stacor Equipment Co. H13

Furniture—Cafeteria
Chicago Hardware Foundry Co., The J9
Hamilton Mfg. Co. J-1/Ha
Heywood-Wakefield Co. F-1/He
Howe Folding Furniture, Inc. J10
Metwood Mfg. Co. J14
Midwest Folding Products J18
Mitchell Mfg. Co. J15-17
Shwayder Bros., Inc. F29
Sico Mfg. Co., Inc. J19
Van Range Co., The John J20

Furniture—Classroom
BeLa Div., J & J Tool and Machine Co. F-1/JJ
Borroughs Mfg. Co. F30
Chicago Hardware Foundry Co., The J9
Durham Mfg. Corp. F28
Heywood-Wakefield Co. F-1/He
Metalstand Co. F27
Royal Metal Mfg. Co. J-3/Ro
Schoolco, Inc. F-1/Be
Toledo Metal Furniture Co. K14
Western Mfg. Co. F26

Furniture—Dormitory
Hamilton Mfg. Co. J-1/Ha
Royal Metal Mfg. Co. J-3/Ro
Simmons Co. J-3/Si
Superior Sleeprite Corp. J28, 29

Furniture—Homemaking
Hamilton Mfg. Co. J-1/Ha

Furniture—Laboratory
Borroughs Mfg. Co. F30
Duralab Equipment Corp. G-1/Du
Hamilton Mfg. Co. J-1/Ha
Laboratory Furniture Co., Inc. G-1/La
Metalab Equipment Co. G-1/Me
MobiLab Mfg. Co. G24, 25
Toledo Metal Furniture Co. K14

Furniture—Library (see Library Equipment)

Furniture—Lounge
Royal Metal Mfg. Co. J-3/Ro
Simmons Co. J-3/Si
Superior Sleeprite Corp. J28, 29

Furniture—Science Room
Duralab Equipment Corp. G-1/Du
Hamilton Mfg. Co. J-1/Ha
Laboratory Furniture Co., Inc. G-1/La
Metalab Equipment Co. G-1/Me
MobiLab Mfg. Co. G24, 25

Furniture—Typing Room
Metalstand Co. F27
Royal Metal Mfg. Co. J-3/Ro
Toledo Metal Furniture Co. K14

Fuses
Graybar Electric Co., Inc. C32

Gage Blocks
Brown & Sharpe Mfg. Co. G27

Gages
Brown & Sharpe Mfg. Co. G27
Lufkin Rule Co., The G35
Starrett Co., The L. S. G36

Gang Mowers (see Mowers—Lawn)

Gates—Chain Link
Anchor Fence Div., Anchor Post Products, Inc. D7
Colorado Fuel and Iron Corp., The D-1/Co
Cyclone Fence Dept., United States Steel D8

Gates—Collapsible, Aluminum and Steel
Superior Wire & Iron Products Inc. B14, 15

Generators—Laboratory
Radio Corp. of America E-1/RCA

Generators—Steam (see Boilers)

Germicide
Huntington Laboratories, Inc. M-4/Hu

Glass—Door
Libbey-Owens-Ford Glass Co. A-5/LOF

Glass—Glare Reducing
Libbey-Owens-Ford Glass Co. A-5/LOF
Pittsburgh Plate Glass Co. A16, 17

Glass—Heat Reducing
Libbey-Owens-Ford Glass Co. A-5/LOF
Pittsburgh Plate Glass Co. A16, 17

Glass—Insulating
Libbey-Owens-Ford Glass Co. A-5/LOF
Pittsburgh Plate Glass Co. A16, 17

Glass—Safety, Shock Resisting
Libbey-Owens-Ford Glass Co. A-5/LOF
Pittsburgh Plate Glass Co. A16, 17

Glass—Spandrel
Libbey-Owens-Ford Glass Co. A-5/LOF
Pittsburgh Plate Glass Co. A16, 17

Glass—Window
Libbey-Owens-Ford Glass Co. A-5/LOF
Pittsburgh Plate Glass Co. A16, 17

Glides—Furniture
Bassick Co., The F-1/Ba
Faultless Caster Corp. F25

Goal Posts—Football
Cyclone Fence Dept., United States Steel D8
Ever-Wear D11

Grandstands
American Bridge Div., United States Steel D9
Hussey Mfg. Co., Inc. L17
Pittsburgh-Des Moines Steel Co. D-3/Pi
Snyder Tank Corp. D10
Universal Bleacher Co. L19

Grinding Machines
Brown & Sharpe Mfg. Co. G27
Cincinnati Milling Machine Co., The G32, 33

Guards—Window
Superior Wire & Iron Products, Inc. B14, 15

Gym Apparatus
Ever-Wear D11
Fair-Play Scoreboard Co. L15
Naden Industries L18
Nissen Medart Corp. L20
Nissen Trampoline Co. L-3/Ni

Gymnasium Finishes—Floor
Finnell System, Inc. M9
Hillyard Chemical Co. M18
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12

Hacksaws (see Saws)

Hand Tools and Accessories
Brown & Sharpe Mfg. Co. G27
Lufkin Rule Co., The G35
Starrett Co., The L. S. G36

Hardware—Cabinet
Glynn-Johnson Corp. B-6/Gl

Hardware—Door
Glynn-Johnson Corp. B-6/Gl
Norton Door Closers B20

Hardware—Furniture
Bassick Co., The F-1/Ba
Faultless Caster Corp. F25

Hardware—Stage
Automatic Devices Co. H7
Novelty Scenic Studios, Inc. H-2/No

Heaters—Water, Lab
Barnstead Still & Sterilizer Co. G21

Heating—Baseboard
Rittling Corp., The C19
Vulcan Radiator Co., The C-1/Vu

Heating Systems
American Air Filter Co., Inc. 018
Gannon Corp. of America C16
International Boiler Works Co., The C17
Rittling Corp., The C19
Vulcan Radiator Co., The C-1/Vu

Heating and Ventilating Units (see Unit Heating and Ventilating)

High Fidelity Components
Radio Corp. of America E-1/RCA
University Loudspeakers, Inc. H12

Holders—Door (see Hardware—Door)

Homemaking—Furniture (see Furniture—Homemaking)

Honor Rolls (see Plaques)

Horns (see Bells, Buzzers)

Incinerators
Brule Incinerators C20
Goder Incinerators, Joseph C21
Morse Boulger, Inc. C22

Intercommunication Systems
Graybar Electric Co., Inc. C32
Radio Corp. of America E-1/RCA

Jointers
Atlas Press Co. G28, 29
Duro Metal Products Co. G31

Joists—Steel
Laclede Steel Co. A9
Macomber A10

Kettles—Cooking
Hubbert & Son, Inc., B. H. J21
Van Range Co., The John J20

Kilns
Harrop Precision Furnace Co. G22

Kitchens—Compact
Dwyer Products Corp. J27

Laboratory Apparatus and Instruments
Barnstead Still & Sterilizer Co. G21
Klett Mfg. Co. G23
Philco TechRep Div. G-2/Ph
Tinsley Laboratories, Inc. G26

Laboratory Furniture (see Furniture—Laboratory)

Language Laboratory Equipment
Encyclopaedia Britannica Films Inc. E11
Hamilton Mfg. Co. J-1/Ha
Metal Works, Inc. E12
Radio Corp. of America E-1/RCA
Rheem Califone Corp. E8, 9; 13
Thompson Ramo Wooldridge, Inc. E14

Lath—Metal
Inland Steel Products Co. A13

Lathes
Atlas Press Co., Clausing Div. G28, 29
Cincinnati Lathe and Tool Co. G30
Duro Metal Products Co. G31
Logan Engineering Co. G34
Sheldon Machine Co., Inc. G-4/Sh

Lawn Care Equipment
Devere Co. D13
Gravely Clean-Cut Mowers D14
Gravely Tractors D15
Jacobsen Mfg. Co. D16

Lawn Mowers (see Mowers)

Letter Boxes (see Mail Handling Equipment)

Letters—Architectural
Architectural Bronze & Aluminum Corp. B21
Michaels Art Bronze Co., The B22

Levels (see Tools—Measuring)

Library Equipment
Ames Co., W. R. B16
Borroughs Mfg. Co. F30
Hamilton Mfg. Co. J-1/Ha

Light Adjustment (see Blinds, Curtains, Shades)

Lighting Control—Electrical
Adam Electric Co., Frank H-2/Ad
Century Lighting, Inc. H8, 9
Kliegl Bros. H10, 11

Lighting Fixtures (see Fixtures—Lighting)

Lighting—Flood
Century Lighting, Inc. H8, 9
General Lighting Co. C27
Graybar Electric Co., Inc. C32
Kliegl Bros. H10, 11

Lighting—Foot
Century Lighting, Inc. H8, 9
General Lighting Co. C27
Kliegl Bros. H10, 11

Lighting—Spot
Century Lighting, Inc. H8, 9
General Lighting Co. C27
Kliegl Bros. H10, 11
Novelty Scenic Studios, Inc. H-2/No

Lighting—Stage
Adam Electric Co., Frank H-2/Ad
Century Lighting, Inc. H8, 9
General Lighting Co. C27
Kliegl Bros. H10, 11
Novelty Scenic Studios, Inc. H-2/No

Lighting Systems
Adam Electric Co., Frank H-2/Ad
Century Lighting, Inc. H8, 9
Exide Industrial Marketing Div., Electric Storage Battery Co., The C31
General Lighting Co. C27
Holophane Co., Inc. C28, 29
Kliegl Bros. H10, 11

Lighting Systems—Emergency
Exide Industrial Marketing Div., Electric Storage Battery Co., The C31

Lockers
DeBourgh Mfg. Co. F31
Lyon Metal Products, Inc. F32, 33
Superior Wire & Iron Products, Inc. B14, 15
Vogel-Peterson Co. F-4/Vo

Locks—Cabinet, Drawer
National Lock Co. F36

Locks—Combination
Master Lock Co. F35
National Lock Co. F36

Loudspeakers (see Speakers)

Mail Boxes (see Mail Handling Equipment)

Mail Handling Equipment
Corbin Wood Products Div., American Hardware Corp. B19

Maintenance Supplies (see Custodian Supplies)

Mats—Floor, Rubber
Musson Rubber Co., The R. C. B10

Mattresses and Springs
Simmons Co. J-3/Si
Superior Sleeprite Corp. J28, 29

Measuring Equipment—Electronic
Brown & Sharpe Mfg. Co. G27

Memorial Plaques
Architectural Bronze & Aluminum Corp. ..B21
Michaels Art Bronze Co., The B22

Merry-Go-Rounds
Ever-Wear D11
Trojan Playground Equipment Mfg. Co. ..D12

Metal Trim & Base
Inland Steel Products Co. A13

Meters—Parking
Michaels Art Bronze Co., The B22

Meters—Purity
Barnstead Still & Sterilizer Co. G21

Micrometers
Brown & Sharpe Mfg. Co. G27
Lufkin Rule Co., The G35
Starrett Co., The L. S. G36

Microphones
Radio Corp. of America E-1/RCA

Microscopes—Electron
Radio Corp. of America E-1/RCA

Milling Machines
Atlas Press Co., Clausing Div. G28, 29
Brown & Sharpe Mfg. Co. G27
Cincinnati Milling Machine Co., The ..G32, 33
Sheldon Machine Co., Inc. G-4/Sh
U. S. Burke Machine Tool Div. G37

Mixers—Food
Triumph Mfg. Co., The J24

Mop Cleaners—Stationary
Spencer Turbine Co., The M14

Mop Trucks
Finnell System, Inc. M9

Motors—Stage Curtain Control
Novelty Scenic Studios, Inc. H-2/No

Mountings—Chalkboard, Tackboard, Pegboard
Ames Co., W. R. B16
Claridge Products and Equipment, Inc. ..B17
Hamilton Mfg. Co. J-1/Ha
Schoolco, Inc. F-1/Be

Mowers—Lawn, Power
Devore Co. D13
Gravely Clean-Cut Mowers D14
Gravely Tractors D15
Jacobsen Mfg. Co. D16

Mulchers—Leaf
Devore Co. D13
Gravely Tractors D15

Nameplates—Desk, Door and Corridor Style
Michaels Art Bronze Co., The B22

Nets—Tennis
Cyclone Fence Dept., United States Steel ..D8
Ever-Wear D11

Office Supplies
National Cash Register Co., The K13

Oscilloscopes
Radio Corp. of America E-1/RCA

Outlet Plates
Graybar Electric Co., Inc. C32

Padding—Gym Wall
Nissen Medart Corp. L20

Padlocks
Master Lock Co. F35
National Lock Co. F36

Paint—Floor (Concrete, Wood)
Huntington Laboratories, Inc. M-4/Hu

Panel Boards
Simplex Time Recorder Co. C34, 35

Panels—Electronic Demonstration
Philco TechRep Div. G-2/Ph

Panels—Exterior Wall (see Curtain-Walls)

Panels—Lighting Control
Adam Electric Co., Frank H-2/Ad
Graybar Electric Co., Inc. C32
Kliegl Bros. H10, 11

Partitions—Coiling
Dubuque Products, Inc. B-4/Du

Partitions—Folding
Dubuque Products, Inc. B-4/Du
Torjesen, Inc. B13

Partitions—Folding, Automatic Electric
Dubuque Products, Inc. B-4/Du

Partitions—Office
Royal Metal Mfg. Co. J-3/Ro

Partitions—Shower
Pennsylvania Slate Producers Guild, Inc. B18

Partitions—Toilet
Pennsylvania Slate Producers Guild, Inc. B18

Partitions—Wire Mesh
Superior Wire & Iron Products, Inc. B14, 15

Pegboards
Brunswick Corp. F24
Hamilton Mfg. Co. J-1/Ha
Schoolco, Inc. F-1/Be

Phonographs (see Transcription Players)

Photometers
Klett Mfg. Co. G23

Physical Training Equipment (see Training Equipment—Physical)

Pipe—Steel
Laclede Steel Co. A9

Piping, Fittings—Laboratory
Barnstead Still & Sterilizer Co. G21
Knight Co., Maurice A. G20

Planfiles (see Cabinets—Planfile)

Plaques
Architectural Bronze & Aluminum Corp. B21
Michaels Art Bronze Co., The B22

Plastic Surfacing (see Surfacing—Furniture)

Plates (see Dishes)

Platforms (see Stages, Platforms)

Playground Equipment
Ever-Wear D11
Nissen Trampoline Co. L-3/Ni
Trojan Playground Equipment Mfg. Co. D12

Plumbing
Century Brass Works, Inc. C-3/Ce
Cordley and Hayes C23
Filtrine Mfg. Co. C-3/Fi
Symmons Engineering Co. C24
Taylor Co., The Halsey W. C25

Polish—Floor (see Floor Finishes)

Pool Cleaning Equipment
Spencer Turbine Co., The M14

Pools—Swimming
American Bridge Div., United States Steel D9

Posts—Fence (see Fencing)

Potentiometers
Klett Mfg. Co. G23

Power Tools and Accessories
Atlas Press Co., Clausing Div. G28, 29
Brown & Sharpe Mfg. Co. G27
Cincinnati Lathe & Tool Co. G30
Duro Metal Products Co. G31
Sheldon Machine Co., Inc. G-4/Sh
U. S. Burke Machine Tool Div. G37

Precision Tools
Brown & Sharpe Mfg. Co. G27
Lufkin Rule Co., The G35
Starrett Co., The L. S. G36

Programming Systems (see Clocks—Program and Signal Systems)

Projectors—Motion Picture
Radio Corp. of America E-1/RCA
Victor Animatograph Corp. E-1/Ka

Projectors—Slidefilm
Victor Animatograph Corp. E-1/Ka

Public Address Systems (see Sound Systems)

Public Relations
American City Bureau K15

Pumps
Brown & Sharpe Mfg. Co. G27

Pumps—Bottle, Lab
Barnstead Still & Sterilizer Co. G21

Racks—Basket
Ever-Wear D11
Lyon Metal Products, Inc. F32, 33

Racks—Bicycle
Ever-Wear D11
Trojan Playground Equipment Mfg. Co. D12

Racks—Book, Magazine, Newspaper
Ames Co., W. R. B16
Hamilton Mfg. Co. J-1/Ha
Laboratory Furniture Co., Inc. G-1/La

Racks—Clothing (Also see Wardrobes and Cabinets—Wardrobe)
Ames Co., W. R. B16
Borroughs Mfg. Co. F30
Lyon Metal Products, Inc. F32, 33
Nelson Co., Inc., A. R. F37
Royal Metal Mfg. Co. J-3/Ro
Vogel-Peterson Co. F-4/Vo

Racks—Food Service
Crescent Metal Products, Inc. J-2/Cr

Racks—Refrigerator
Crescent Metal Products, Inc. J-2/Cr

Racks—Sorting
Lyon Metal Products, Inc. F32, 33

Racks—Umbrella
Vogel-Peterson Co. F-4/Vo

Radios
Radio Corp. of America E-1/RCA
Rheem Califone Corp. E8, 9; 13

Railings—Stair
Michaels Art Bronze Co., The.....B22

Rebound Tumbling Apparatus
Ever-Wear D11
Nissen Trampoline Co. L-3/Ni

Receptacles—Sanitary Napkin
Bennett Mfg. Co., Inc. M16

Receptacles—Waste, Indoor
Bennett Mfg. Co., Inc. M16

Receptacles—Waste, Outdoor
Bennett Mfg. Co., Inc. M16

Record Players (see Transcription Players)

Recorders—Tape
Radio Corp. of America E-1/RCA
Rheem Califone Corp. E8, 9; 13

Records—Musical, Educational
Radio Corp. of America E-1/RCA

Refrigerators
Dwyer Products Corp. J27
Jordon Commercial Refrigerator Co. J22
Puffer-Hubbard Refrigerator Co. J23
Victory Metal Mfg. Corp. J26

Refrigerators—Built-In (for Compact Kitchens)
Dwyer Products Corp. J27

Removers—Floor Finish
Finnell System, Inc. M9
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12

Resistors—Non-Metallic
Harrop Precision Furnace Co. G22

Rigging—Stage (see Hardware—Stage)

Risers—Choral, Chair, etc.
Hamilton Mfg. Co. J-1/Ha
Metwood Mfg. Co. J14
Midwest Folding Products.....J18
Mitchell Mfg. Co. J15-17
Safway Steel Products, Inc. L-1/Sa

Risers—Stair
Musson Rubber Co., The R. C. B10
Pennsylvania Slate Producers Guild, Inc. B18

Roof Construction
Childers Manufacturing Co. A12
Inland Steel Products Co. A13
Laclede Steel Co. A9
Macomber A10
Weyerhaeuser Co. A11

Routers
Duro Metal Products Co. G31

Rug Shampooing Machines (see Shampooing Machines—Rug)

Rules—Measuring (see Tools—Measuring)

Runners—Floor, Rubber
Musson Rubber Co., The R. C. B10

Saddles—Door (see Thresholds)

Sanders—Portable, Hand
Clarke Floor Machine Co. M8

Sanders—Power
Atlas Press Co., Clausing Div. G28, 29
Duro Metal Products Co. G31

Sanding Machines—Floor (see Floor Maintenance Machines)

Saws—Shop
Atlas Press Co., Clausing Div. G28, 29
Duro Metal Products Co. G31
Starrett Co., The L. S. G36

Scenery—Stage
Novelty Scenic Studios, Inc. H-2/No

Science Room Furniture (see Furniture—Science Room)

Scientific Apparatus
Barnstead Still & Sterilizer Co. G21
Klett Mfg. Co. G23
Philco TechRep Div. G-2/Ph

Scoreboards
Fair-Play Scoreboard Co. L15
Naden Industries L18
Nissen Medart Corp. L20

Screw Machines
Brown & Sharpe Mfg. Co. G27

Screwdrivers
Starrett Co., The L. S. G36

Seals—Floor (see Floor Finishes)

Seating—Athletic Field, Stadium
American Bridge Div., United States Steel D9
Hussey Mfg. Co., Inc. L17
Pittsburgh-Des Moines Steel Co. D-3/Pi
Snyder Tank Corp. D10
Universal Bleacher Co. L19

Seating—Auditorium, Chapel (see Chairs)

Seating—Classroom (see Furniture—Classroom)

Seating—Gym
Hussey Mfg. Co., Inc. L17
Nissen Medart Corp. L20
Safway Steel Products, Inc. L-1/Sa
Universal Bleacher Co. L19

Seats—Campus, Park
Ever-Wear D11
Trojan Playground Equipment Mfg. Co. D12

Seed Spreaders—Lawn
Gravely Tractors D15

Seesaws
Ever-Wear D11
Trojan Playground Equipment Mfg. Co. D12

Settees
Ever-Wear D11
Royal Metal Mfg. Co. J-3/Ro
Simmons Co. J-3/Si

Sewing Machines
Singer Sewing Machine Co. G38

Shades—Window
Forse Mfg. Co. A19
Joanna Western Mills Co. A20
Schoolco, Inc. F-1/Be

Shampoo—Rug, Upholstery
Finnell System, Inc. M9
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12

Shampooing Machines—Rug
Clarke Floor Machine Co. M8
Finnell System, Inc. M9
Hild Floor Machine Co., Inc. M-1/Hi
Holt Mfg. Co. M11
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12
United Floor Machine Co., Inc. M15

Shampooing Machines—Upholstery
Clarke Floor Machine Co. M8
Hild Floor Machine Co., Inc. M-1/Hi
Holt Mfg. Co. M11
Multi-Clean Products, Inc. M12

Shapers
Duro Metal Products Co. G31
Logan Engineering Co. G34
Sheldon Machine Co., Inc. G-4/Sh

Shelving Accessories
Ames Co., W. R. B16

Shelving—Steel
Ames Co., W. R. B16
Borroughs Mfg. Co. F30
Lyon Metal Products, Inc. F32, 33

Shelving—Wall Hung
Ames Co., W. R. B16
Nelson Co., Inc. A. R. F37
Simmons Co. J-3/Si
Vogel-Peterson Co. F-4/Vo

Shelving—Wood
Laboratory Furniture Co., Inc. G-1/La

Shower Heads
Symmons Engineering Co. C24

Shower Stalls (see Partitions)

Shutters—Counter
Dubuque Products, Inc. B-4/Du

Signal Systems
Graybar Electric Co., Inc. C32
Montgomery Mfg. Co., Inc. C33
Radio Corp. of America E-1/RCA
Simplex Time Recorder Co. C34, 35

Signs—Metal (see Plaques)

Sills, Stools—Window

Musson Rubber Co., The R. C. B10
Pennsylvania Slate Producers Guild, Inc. B18

Silverware

International Silver Co., The J12
Oneida Silversmiths J13

Sinks—Classroom, Laboratory

Century Brass Works, Inc. C-3/Ce
Duralab Equipment Corp. G-1/Du
Hamilton Mfg. Co. J-1/Ha
Heywood-Wakefield Co. F-1/He
Knight Co., Maurice A. G20
Laboratory Furniture Co., Inc. G-1/La
Metalab Equipment Co. G-1/Me
Pennsylvania Slate Producers Guild, Inc. B18

Sinks—Kitchen, Homemaking

Hamilton Mfg. Co. J-1/Ha
Van Range Co., The John J20

Sirens (see Signal Systems)

Slicing Machines—Food

Triumph Mfg. Co., The J24

Slides—Playground

Ever-Wear D11
Trojan Playground Equipment Mfg. Co. D12

Snow Removing Equipment—Power

Gravely Clean-Cut Mowers D14
Gravely Tractors D15

Sound Systems

Graybar Electric Co., Inc. C32
Radio Corp. of America E-1/RCA
Rheem Califone Corp. E8, 9; 13
University Loudspeakers, Inc. H12

Speakers

Radio Corp. of America E-1/RCA
University Loudspeakers, Inc. H12

Spotlights (see Lighting—Spot)

Sprinkler Systems

Grinnell Co. C26

Stadium Seat Brackets

Hohmann and Barnard of Alabama, Inc. L16

Stadiums

American Bridge Div., United States Steel D9
Pittsburgh-Des Moines Steel Co. D-3/Pi

Stage Curtains (see Curtains—Stage)

Stage Curtain Tracks and Controls

Automatic Devices Co. H7

Stage Hardware (see Hardware—Stage)

Stage Lighting (see Lighting—Stage)

Stages, Platforms—Folding

Hamilton Mfg. Co. J-1/Ha
Metwood Mfg. Co. J14
Midwest Folding Products J18
Mitchell Mfg. Co. J15-17
Sico Mfg. Co., Inc. J19

Stair Treads (see Treads)

Stalls—Shower (see Partitions)

Stanchions

Novelty Scenic Studios, Inc. H-2/No

Stands (see Racks)

Stands—Band, Choral, etc.

Hamilton Mfg. Co. J-1/Ha
Metwood Mfg. Co. J14
Midwest Folding Products J18
Mitchell Mfg. Co. J15-17
Safway Steel Products, Inc. L-1/Sa

Stands—Bedside

Royal Metal Mfg. Co. J-3/Ro
Superior Sleeprite Corp. J28, 29

Stands—Office, Machine, Typewriter

Metalstand Co. F27

Sterilizers—Lab

Barnstead Still & Sterilizer Co. G21

Stills—Water

Barnstead Still & Sterilizer Co. G21

Stools

Chicago Hardware Foundry Co., The J9
Lyon Metal Products, Inc. F32, 33
Royal Metal Mfg. Co. J-3/Ro
Toledo Metal Furniture Co. K14

Stops—Door

Glynn-Johnson Corp. B-6/Gl

Sumps—Laboratory

Knight Co., Maurice A. G20

Surfacing—Furniture

Duralab Equipment Corp. G-1/Du
Hamilton Mfg. Co. J-1/Ha
Johns-Manville G19

Sweepers—Power

Clarke Floor Machine Co. M8
Gravely Tractors D15

Swings—Playground

Ever-Wear D11
Trojan Playground Equipment Mfg. Co. D12

Switchboards—Lighting

Adam Electric Co., Frank H-2/Ad
Century Lighting, Inc. H8, 9
Kliegl Bros. H10, 11

Switches—Lighting

Adam Electric Co., Frank H-2/Ad

T Squares (see Tools—Measuring)

Table Bases

Chicago Hardware Foundry Co., The J9

Table, Bench Combination

Ever-Wear D11
Howe Folding Furniture, Inc. J10
Mitchell Mfg. Co. J15-17
Sico Mfg. Co., Inc. J19

Table Tops (see Surfacing)

Table Tops—Laboratory (see Surfacing)

Hamilton Mfg. Co. J-1/Ha
Johns-Manville G19

Tables—Cafeteria

Brunswick Corp. F24
Chicago Hardware Foundry Co., The J9
Hamilton Mfg. Co. J-1/Ha
Heywood-Wakefield Co. F-1/He
Howe Folding Furniture, Inc. J10
Metwood Mfg. Co. J14
Midwest Folding Products J18
Mitchell Mfg. Co. J15-17
Royal Metal Mfg. Co. J-3/Ro
Sico Mfg. Co., Inc. J19

Tables—Conference, Library, Study, Office

BeLa Div., J & J Tool and Machine Co. F-1/JJ
Heywood-Wakefield Co. F-1/He
Mitchell Mfg. Co. J15-17
Royal Metal Mfg. Co. J-3/Ro
Shwayder Bros., Inc. F29
Western Mfg. Co. F26

Tables—Drawing

Hamilton Mfg. Co. J-1/Ha
Lyon Metal Products, Inc. F32, 33
Stacor Equipment Co. H13

Tables—Folding

Hamilton Mfg. Co. J-1/Ha
Howe Folding Furniture, Inc. J10
Metwood Mfg. Co. J14
Midwest Folding Products J18
Mitchell Mfg. Co. J15-17
Shwayder Bros., Inc. F29

Tables—Folding, Wall Storage

Hamilton Mfg. Co. J-1/Ha
Mitchell Mfg. Co. J15-17

Tables—Laboratory

Duralab Equipment Corp. G-1/Du
Hamilton Mfg. Co. J-1/Ha
Laboratory Furniture Co., Inc. G-1/La
Metalab Equipment Co. G-1/Me
MobiLab Mfg. Co. G24, 25

Tables—Sectional

Chicago Hardware Foundry Co., The J9

Tables—Sewing Room

Hamilton Mfg. Co. J-1/Ha
Singer Sewing Machine Co. G38

Tables—Shop

Borroughs Mfg. Co. F30
Hamilton Mfg. Co. J-1/Ha
Lyon Metal Products, Inc. F32, 33
Stacor Equipment Co. H13

Tables—Tennis

Ever-Wear D11
Hamilton Mfg. Co. J-1/Ha
Metwood Mfg. Co. J14
Mitchell Mfg. Co. J15-17
Sico Mfg. Co., Inc. J19

Tablets—Bronze, Aluminum

Architectural Bronze & Aluminum Corp. B21
Michaels Art Bronze Co., The B22

Tableware—Silverplate, Stainless

International Silver Co., The J12
Oneida Silversmiths J13

Tackboard

Brunswick Corp. F24
Claridge Products and Equipment Inc. B17
Hamilton Mfg. Co. J-1/Ha
Schoolco, Inc. F-1/Be

Tanks—Laboratory

Knight Co., Maurice A. G20

Tape—Electrical

Graybar Electric Co., Inc. C32

Tapes—Measuring (see Tools—Measuring)

Teaching Machines

Encyclopaedia Britannica Films Inc. E11
Rheem Califone Corp. E8, 9; 13

Telephone Systems (see Intercommunication Systems)

Telescopes

Tinsley Laboratories, Inc. G26

Television Antenna Poles

Trojan Playground Equipment Mfg. Co. D12

Television Cameras

Argus Cameras, Inc. E7
Philco Corp., Government & Industrial Div. E10
Radio Corp. of America E-1/RCA
Thompson Ramo Wooldridge, Inc. E14

Television—Closed Circuit

Argus Cameras, Inc. E7
Philco Corp., Government & Industrial Div. E10
Radio Corp. of America E-1/RCA
Thompson Ramo Wooldridge, Inc. E14

Television—Educational Broadcast Equipment

Philco Corp., Government & Industrial Div. E10
Radio Corp. of America E-1/RCA
Thompson Ramo Wooldridge, Inc. E14

Television Kinescope Recorders

Thompson Ramo Wooldridge, Inc. E14

Television Receivers and Monitors

Argus Cameras, Inc. E7
Radio Corp. of America E-1/RCA

Television Video Tape Recorders

Radio Corp. of America E-1/RCA

Tennis Court Enclosures (see Enclosures—Tennis Court)

Tennis Nets (see Nets—Tennis)

Therapy Equipment (see Training Equipment—Physical)

Thresholds

Accurate Metal Weather Strip Co., Inc. ..A14
American Abrasive Metals Co. B8, 9
American Mason Safety Tread Co. B7
Wooster Products, Inc. B11

Tile—Ceramic Floor

Monarch Tile Mfg., Inc. B-2/Mo
Natco Corp. B12

Tile—Ceramic Wall

Monarch Tile Mfg., Inc. B-2/Mo
Natco Corp. B12

Tile—Glazed Wall

Monarch Tile Mfg., Inc. B-2/Mo
Natco Corp. B12

Tile—Structural

Natco Corp. B12

Time Systems (see Signal Systems and Clocks—Program)

Toilet Compartments (see Partitions—Toilet)

Tool Attachments—Machine

Brown & Sharpe Mfg. Co. G27
Cincinnati Milling Machine Co., The G32, 33
Logan Engineering Co. G34
Sheldon Machine Co., Inc. G-4/Sh

Tool Sets (see Tools—Hand)

Tools—Hand

Brown & Sharpe Mfg. Co. G27
Lufkin Rule Co., The G35
Starrett Co., The L. S. G36

Tools—Machine

Atlas Press Co. G28, 29
Brown & Sharpe Mfg. Co. G27
Cincinnati Lathe and Tool Co. G30
Cincinnati Milling Machine Co., The ..G32, 33
Duro Metal Products Co. G31
Logan Engineering Co. G34
Sheldon Machine Co., Inc. G-4/Sh
U. S. Burke Machine Tool Div. G37

Tools—Measuring

Brown & Sharpe Mfg. Co. G27
Lufkin Rule Co., The G35
Starrett Co., The L. S. G36

Tops (see Surfacing—Furniture)

Tote Trays

Duralab Equipment Corp. G-1/Du
Fabri-Form Co., The F34
Hamilton Mfg. Co. J-1/Ha

Tracks—Curtain, Window

Automatic Devices Co. H7
Forse Mfg. Co. A19
Novelty Scenic Studios, Inc. H-2/No

Tracks—Hospital Cubicle

Automatic Devices Co. H7
Nelson Co., Inc., A. R. F37

Tractor Accessories, Attachments

Gravely Tractors D15
Jacobsen Mfg. Co. D16

Tractors

Gravely Tractors D15
Jacobsen Mfg. Co. D16

Training Equipment—Physical

Nissen Medart Corp. L20
Nissen Trampoline Co. L-3/Ni

Training Program—Electronic

Philco TechRep Div. G-2/Ph
Radio Corp. of America E-1/RCA

Transcription Players

Rheem Califone Corp. E8, 9; 13

Transformers

Graybar Electric Co., Inc. C32

Trays—Classroom Storage

Fabri-Form Co., The F34
Lyon Metal Products, Inc. F32, 33

Trays—Dish, Food Serving

Keyes Fibre Co. J11

Treads—Stair

American Abrasive Metals Co. B8, 9
Musson Rubber Co., The R. C. B10
Natco Corp. B12
Pennsylvania Slate Producers Guild, Inc. B18

Treads—Stair, Safety (for Stairways, Platforms, Ramps)

American Abrasive Metals Co. B8, 9
American Mason Safety Tread Co. B7
Musson Rubber Co., The R. C. B10
Wooster Products, Inc. B11

Trim—Chalkboard, Tackboard, Pegboard (see Mountings)

Troughs—Chalkboard (see Mountings)

Trucks—Book
Ames Co., W. R. B16
Lyon Metal Products, Inc. F32, 33

Trucks—Chair, Table, etc.
Howe Folding Furniture, Inc. J10
Metwood Mfg. Co. J14
Midwest Folding Products J18
Mitchell Mfg. Co. J15-17

Trucks—Food Service
Crescent Metal Products, Inc. J-2/Cr
Van Range Co., The John J20

Trucks—Toy, Clay
Heywood-Wakefield Co. F-1/He

Trusses—Roof (see Building Construction)

Tubes—Electron
Radio Corp. of America E-1/RCA

Typing Room Furniture (see Furniture—Typing Room)

Unit Heating and Ventilating
American Air Filter Co., Inc. C18
Gannon Corp. of America C16
Rittling Corp., The C19
Vulcan Radiator Co., The C-1/Vu

Unit Ventilators
American Air Filter Co., Inc. C18
Gannon Corp. of America C16
Rittling Corp., The C19
Vulcan Radiator Co., The C-1/Vu

Urinal Screens (see Partitions)

Utensils—Cooking (see Cooking Units and Kettles—Cooking)

Vacuum Cleaners—Boiler, Furnace
Clarke Floor Machine Co. M8
Hild Floor Machine Co., Inc. M-1/Hi
Multi-Clean Products, Inc. M12
Spencer Turbine Co., The M14
United Floor Machine Co., Inc. M15

Vacuum Cleaners—Dry, Wet Pickup
Cassidy Products, Inc. M7
Clarke Floor Machine Co. M8
Finnell System, Inc. M9
General Floorcraft, Inc. M10
Hild Floor Machine Co., Inc. M-1/Hi
Hillyard Chemical Co. M18
Holt Mfg. Co. M11
Huntington Laboratories, Inc. M-4/Hu
Multi-Clean Products, Inc. M12
Pullman Vacuum Cleaner Corp. M13
Spencer Turbine Co., The M14
United Floor Machine Co., Inc. M15

Vacuum Cleaners—Portable
Spencer Turbine Co., The M14

Vacuum Cleaning Systems—Stationary
Spencer Turbine Co., The M14

Valves—Mechanical Shower
Symmons Engineering Co. C24

Valves—Pressure Actuated, Anti-Scald Shower
Symmons Engineering Co. C24

Valves—Thermostatic Controllers
Symmons Engineering Co. C24

Varnish Remover (see Removers—Floor Finish)

Venetian Blinds (see Blinds)

Ventilating and Heating Units (see Unit Heating and Ventilating)

Vises
Brown & Sharpe Mfg. Co. G27

Voltmeters
Graybar Electric Co., Inc. C32

Voltohmyst
Radio Corp. of America E-1/RCA

Wainscoting—Cushioned
Nissen Medart Corp. I20

Walkway Covers
Childers Manufacturing Co. A12

Wardrobes (see Racks—Clothing and Cabinets—Wardrobe)
Brunswick Corp. F24
Dubuque Products, Inc. B-4/Du
Hamilton Mfg. Co. J-1/Ha
Nelson Co., Inc., A. R. F37
Royal Metal Manufacturing Co. J-3/Ro
Simmons Co. J-3/Si
Vogel-Peterson Co. F-4/Vo

Washroom Hand Dryers
American Dryer Corp. M17
Chicago Hardware Foundry Co., The J9

Waste Disposals (see Incinerators)

Waste Receptacles (see Receptacles—Waste)

Water Coolers (see Coolers)

Wax—Floor (see Floor Finishes)

Weatherstripping
Accurate Metal Weather Strip Co., Inc. ..A14

Window Darkening—Shades, Blinds
Forse Mfg. Co. A19
Joanna Western Mills Co. A20
Levolor Lorentzen, Inc. A-6/Le

Window Walls (see Curtain-Walls)

Windows—Aluminum for Glass Block
Marmet Corp. A18

Windows—Aluminum, Hopper Vent
Marmet Corp. A18

Windows—Aluminum, Projected
Bayley Co., The William A15
Marmet Corp. A18

Windows—Aluminum, Reversible
Michaels Art Bronze Co., The B22

Windows—Basement
Marmet Corp. A18

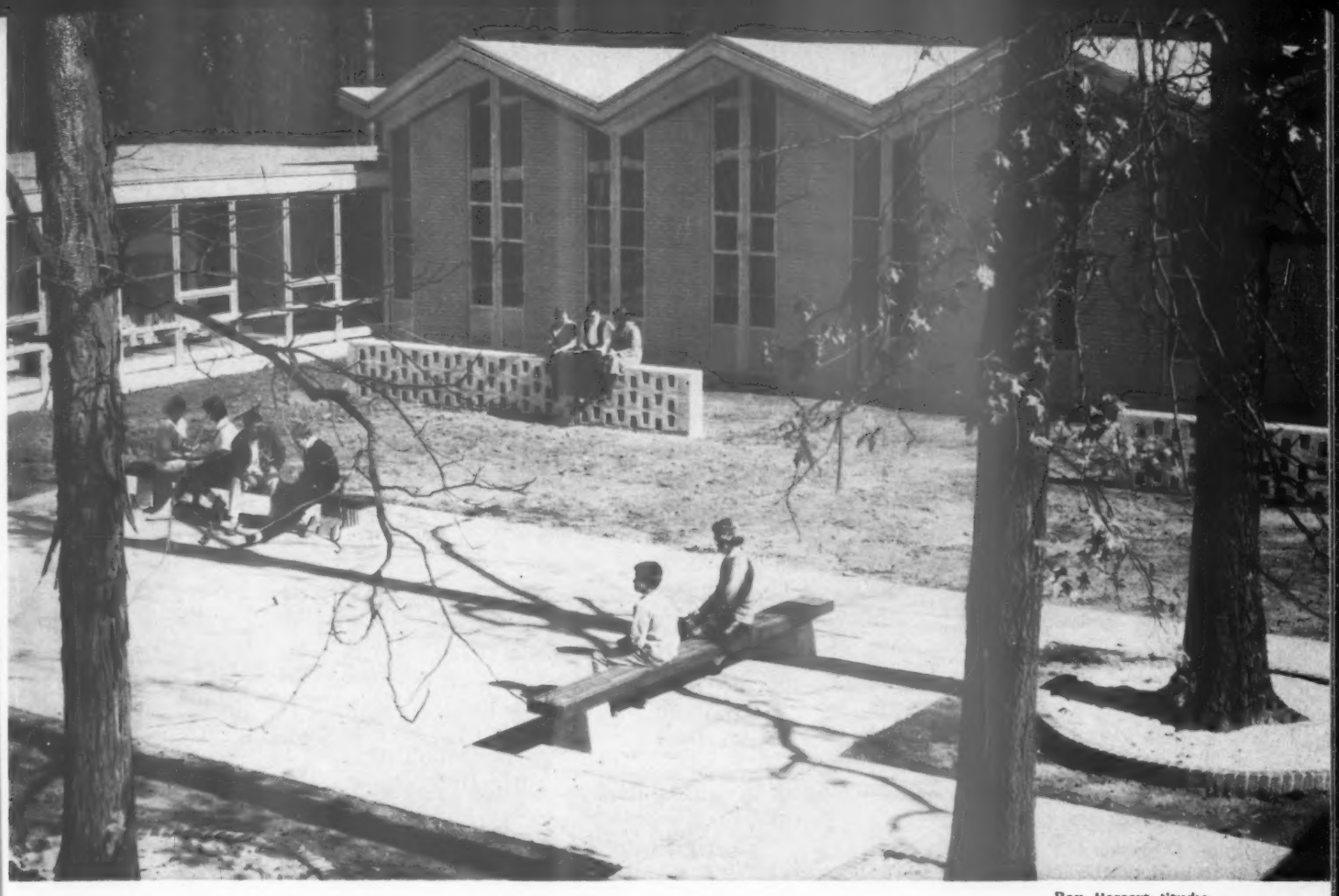
Windows—Custom-Made
Marmet Corp. A18

Windows—Steel, Projected
Bayley Co., The William A15

Wire—Electrical
Graybar Electric Co., Inc. C32

Wire Work Guards, Partitions
Superior Wire & Iron Products, Inc. ..B14, 15

Work Benches (see Benches—Work)



Ray Bossert Studio

A total of 481 private and parochial school buildings were constructed during 1960. Shown here, Maumee Valley Country Day School, Ohio, Eberle M. Smith Associates, Inc., architects.

Educational Construction in 1960

by The Editors

American School and University

1960 FAILED TO HERALD a decade of educational construction milestones and achievements, except in recording the obvious—that it costs more to build new structures than ever before. At present volume, new construction cannot begin to meet the backlog of new facilities and replacement requirements needed for mounting enrollments. Yet, lagging as it does in terms of needs, educational construction helps pace the national picture.

Total Educational Construction

Outlays for educational construction in 1960 totaled 3.6 billion dollars for 8,930 structures. Included in these figures are $2.6 billions for 7,045 public school buildings; $95.4 millions for 481 private and parochial buildings; $866 millions for 1,179 college and university buildings; and $71.7 millions for 225 junior-community college buildings. All figures are the results of AMERICAN SCHOOL AND

Educational Construction in 1960

	Number Buildings		Expenditures	
Public School	7045	(79%)	$2,591,878,767	(72%)
Private & Parochial	481	(5%)	95,380,768	(2%)
College & University	1179	(13%)	865,979,869	(25%)
Junior College	225	(3%)	71,703,007	(1%)
TOTALS	8930		$3,624,942,411	

Total Educational Construction
Public School, Private & Parochial, College & University, Junior College
By Region and State

	Number of Buildings	Expenditures
SOUTH		
Alabama	75	$ 21,387,757
Arkansas	96	18,099,752
Florida	150	31,450,653
Georgia	97	39,278,280
Kentucky	106	34,717,486
Louisiana	140	61,933,140
Mississippi	161	32,185,250
North Carolina	293	59,770,032
South Carolina	70	30,133,006
Tennessee	179	32,791,194
Texas	609	161,886,827
Virginia	188	67,839,793
West Virginia	107	34,953,324
Total	2271	$626,426,494
NEW ENGLAND		
Connecticut	121	$ 74,111,690
Maine	63	14,530,056
Massachusetts	202	109,970,969
New Hampshire	77	22,055,366
Rhode Island	37	20,951,248
Vermont	24	8,320,149
Total	524	$249,939,478
MIDDLE ATLANTIC		
Delaware	23	$ 17,461,719
Maryland	163	94,874,764
New Jersey	192	103,852,009
New York	382	303,901,066
Pennsylvania	418	281,398,206
District of Columbia	23	10,718,473
Total	1201	$812,206,237

	Number of Buildings	Expenditures
CENTRAL		
Illinois	471	$ 182,046,886
Indiana	323	150,422,309
Iowa	145	36,018,392
Kansas	94	32,867,505
Michigan	411	195,663,224
Minnesota	166	125,688,468
Missouri	168	56,501,874
Nebraska	88	57,112,212
North Dakota	49	12,703,426
Ohio	386	170,371,167
Oklahoma	193	35,359,031
South Dakota	79	12,808,891
Wisconsin	201	81,524,543
Total	2774	$1,149,087,928
WEST		
Alaska	20	$ 7,473,626
Arizona	167	43,944,641
California	899	349,341,927
Colorado	195	79,140,280
Hawaii	25	9,034,811
Idaho	49	43,118,923
Montana	24	7,744,828
Nevada	58	14,926,632
New Mexico	114	22,984,928
Oregon	198	59,085,521
Utah	45	22,663,300
Washington	323	117,738,092
Wyoming	43	10,084,765
Total	2160	$ 787,282,274
UNITED STATES TOTALS	8930	$3,624,942,411

Educational Construction in 1958, 1959, 1960
Number of Buildings and Expenditures by Region
(Public, Private, College and University, Junior College)

Region	1958 Number Bldgs.	1958 Expenditures	1959 Number Bldgs.	1959 Expenditures	1960 Number Bldgs.	1960 Expenditures
South	3427	$ 682,478,954	2738	$ 602,861,805	2271	$ 626,426,494
New England	486	204,752,620	518	243,029,490	524	249,939,478
Central	3441	1,267,955,000	2717	1,119,448,535	2774	1,149,087,928
Middle Atlantic	1514	1,136,115,366	1227	883,773,634	1201	812,206,237
West	2431	658,845,872	2101	723,113,458	2160	787,282,274
TOTALS	11,299	$3,950,147,812	9301	$3,572,226,922	8930	$3,624,942,411

UNIVERSITY's twelfth annual analysis of educational construction throughout the nation.

Total expenditures have gone down from 1959 for public schools and junior colleges, but colleges and universities show increased outlays. Private and parochial schools have a sizable gain over 1959 in both numbers of buildings and expenditures. This rise is especially significant in view of the strong fight now being undertaken for Federal funds for church-affiliated schools.

The possibility of Federal aid for public school construction and for higher education gives hope to an increase in construction. Also, record school bond sales in 1960—a $2.2 billion total (32 percent increase over 1959)—auger well for the future.

Ranking of the States

In total construction dollar output—for public school, private and parochial, college and university, junior college—the highest ranking states are:

State	*Number of Buildings*	*Dollars*
California	899	$349,341,927
New York	382	303,901,066
Pennsylvania	418	281,398,206
Michigan	411	195,663,224
Illinois	471	182,046,886
Ohio	386	170,371,167
Texas	609	161,886,827
Indiana	323	150,422,309
Washington	323	117,738,092
Massachusetts	202	109,970,696
New Jersey	192	103,852,009

Public School Construction

Following the trend of the past twelve years, most of the new public schools are elementary structures, while secondary schools continue to cost more to construct. Districts in the central states are the most active in providing new schoolhousing and also lead in dollar outlay.

Besides construction dollars, public schools put forth $255 millions to furnish and equip the new plants. Almost half of this amount equipped secondary schools. For every dollar of construction money, 10 cents was spent for furnishings and equipment. It is estimated that the total spent for furniture and equipment bought for all buildings, old and new, was a considerably higher figure.

Gas was the fuel chosen for more than half of the buildings, with oil next. Coal, electricity, combination gas and oil, wood and sawdust (in lumber regions of Oregon) are also used as fuel sources for new buildings.

The 7,045 public school buildings have added 206,894,855 square feet of area to school district facilities. The average size per elementary building is 20,668 square feet, per secondary building—47,974 square feet. Average site sizes range from 11.08 acres at the elementary level to 26.09 acres at the secondary.

The greatest incidence of air conditioning in new public schools is in states of the west where 11 percent of new structures are fully air conditioned, 20 percent partially so. Throughout the country 18 percent of new structures have some degree of air conditioning.

Public School Construction in 1958, 1959, 1960
Number of Buildings and Expenditures by Region

	1958		1959		1960	
Region	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures
South	2798	$ 495,080,680	2169	$ 394,841,229	1754	$ 387,482,827
New England	281	131,972,404	289	145,382,058	280	150,150,975
Central	2862	946,804,345	2273	835,306,151	2346	857,115,357
Middle Atlantic	1160	957,686,692	929	719,827,262	836	579,073,768
West	2089	520,574,173	1719	524,609,473	1829	618,055,840
TOTALS	9190	$3,052,118,294	7379	$2,619,966,173	7045	$2,591,878,767

Public School Construction in 1958, 1959, 1960
Number of Buildings and Expenditures by Type of School

	1958		1959		1960	
Type of School	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures
Elementary	5117	$1,239,373,716	3741	$ 896,706,350	4214	$1,036,176,937
Secondary	2565	1,600,639,463	2097	1,374,537,419	2326	1,445,105,257
Combination	291	80,794,573	875	286,846,173	154	56,754,749
Other*	1217	131,310,542	666	61,876,231	351	53,841,824
TOTALS	9190	$3,052,118,294	7379	$2,619,966,173	7045	$2,591,878,767

*Gymnasium, administration, school bus, maintenance buildings, etc.

Public School Construction, 1960
Furnishings and Equipment Costs

Type of Building	Number Bldgs.	Construction Cost	Total Furnishings & Equipment Costs	Ratio, Furnishings and Equipment to Construction Costs
Elementary	4214	$1,036,176,937	$ 82,818,107	8.0
Secondary	2326	1,445,105,257	161,602,213	11.2
K-12, Combination	154	56,754,749	5,380,335	9.5
Other	351	53,841,824	5,226,106	9.7
TOTALS	7045	$2,591,878,767	$255,026,761	9.8

Public School Construction in 1960
Fuel Used, by Percent of Buildings

Area	Gas	Oil	Coal	Other*
South	64%	14%	18%	4%
New England	1%	97%	—	2%
Middle Atlantic	22%	70%	6%	2%
Central	46%	43%	9%	2%
West	65%	21%	4%	10%
TOTALS	51%	35%	9%	5%

*Other: Electricity, combination gas and oil, wood, sawdust.

Public School Construction in 1960
Building Area (Square Feet)

Type of Building	Number Bldgs.	Total Area (Square Feet)	Average Area (Square Feet)
Elementary	4214	87,085,800	20,668
Secondary	2326	111,587,437	47,974
K-12, Combination	154	4,395,461	28,542
Other	351	3,826,157	10,901
TOTALS	7045	206,894,855 sq. ft.	29,368 sq. ft.

Public School Construction in 1960

	Average Site Size Per Building	Average Cost Per Acre
Elementary	11.08 acres	$3676.
Secondary	26.09 acres	$2216.
K-12, Combination	17.94 acres	$3551.
Other	13.95 acres	$2964.
TOTALS	16.07 acres	$2865.

Public School Construction in 1960
Air Conditioning Provided by Percent of Buildings

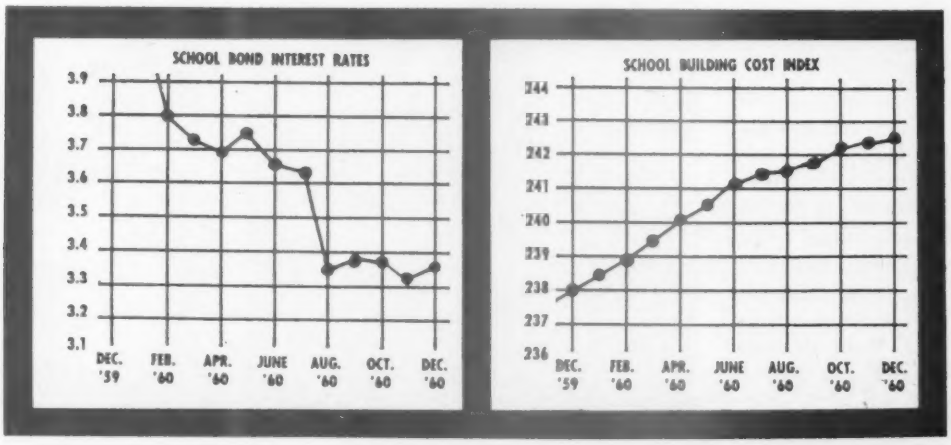
Area	Full Air Conditioning	Partial Air Conditioning	None
South	1.5%	7.5%	91%
New England	2%	18%	80%
Middle Atlantic	2%	12%	86%
Central	2%	15%	83%
West	11%	20%	69%
TOTALS	4%	14%	82%

ELEMENTARY AND SECONDARY SCHOOL BONDS SOLD – 1960

State	Amount (000)	Number of Issues	State	Amount (000)	Number of Issues
Alabama	$ 12,714	8	New Jersey	$ 103,926	93
Alaska	7,458	5	New Mexico	12,900	18
Arizona	26,969	49	New York	284,008	156
Arkansas	3,362	6	North Carolina	39,054	28
California	328,343	431	North Dakota	8,009	24
Colorado	10,300	10	Ohio	156,591	172
Connecticut	42,980	37	Oklahoma	16,199	97
Delaware	5,719	3	Oregon	14,127	46
Florida	26,905	27	Pennsylvania	156,633	161
Georgia	4,872	7	Rhode Island	3,865	6
Hawaii	---	0	South Carolina	10,143	16
Idaho	7,754	10	South Dakota	1,928	11
Illinois	109,777	128	Tennessee	28,953	17
Indiana	37,299	73	Texas	93,537	144
Iowa	25,217	41	Utah	7,611	8
Kansas	19,125	29	Vermont	3,090	9
Kentucky	17,883	48	Virginia	19,773	12
Louisiana	20,988	34	Washington	72,829	76
Maine	6,716	14	West Virginia	2,550	2
Maryland	29,046	7	Wisconsin	46,190	64
Massachusetts	70,858	81	Wyoming	7,347	15
Michigan	139,310	130			
Minnesota	57,085	80			
Mississippi	19,846	22	District of Columbia	$ ---	0
Missouri	29,703	35	Puerto Rico	---	0
Montana	11,124	34	Virgin Islands	---	0
Nebraska	7,030	17			
Nevada	11,190	5			
New Hampshire	5,034	18	Grand Totals	$2,183,870	2,564

Table through courtesy of Investment Bankers Association of America, Washington, D.C.

California and New York lead in dollar value of elementary and secondary school bond issues sold during 1960—with $328 million and $284 million respectively. Next are Ohio and Pennsylvania with $157 million of bond sales each. Interest rates for school bonds dipped from a high of 3.9 percent in December, 1959, to a low of 3.3 percent in October, 1960. A slight increase in interest rates was recorded for the end of 1960 and beginning months of 1961. The index of school building costs is a record of steady rise throughout 1960, with no leveling off point in sight.



School bond interest rates have declined during 1960, while index of building costs shows steady rise. (Tables courtesy of Overview)

Private and Parochial Schools

The gain in new structures by private and parochial schools is considerable, but does not come close to the peak year of 1958. Outlays are almost one-third over those for 1959 and account for 2 percent of all education construction expenditures in the country. In New England, however, private and parochial construction amounts to 21 percent of the total of new buildings.

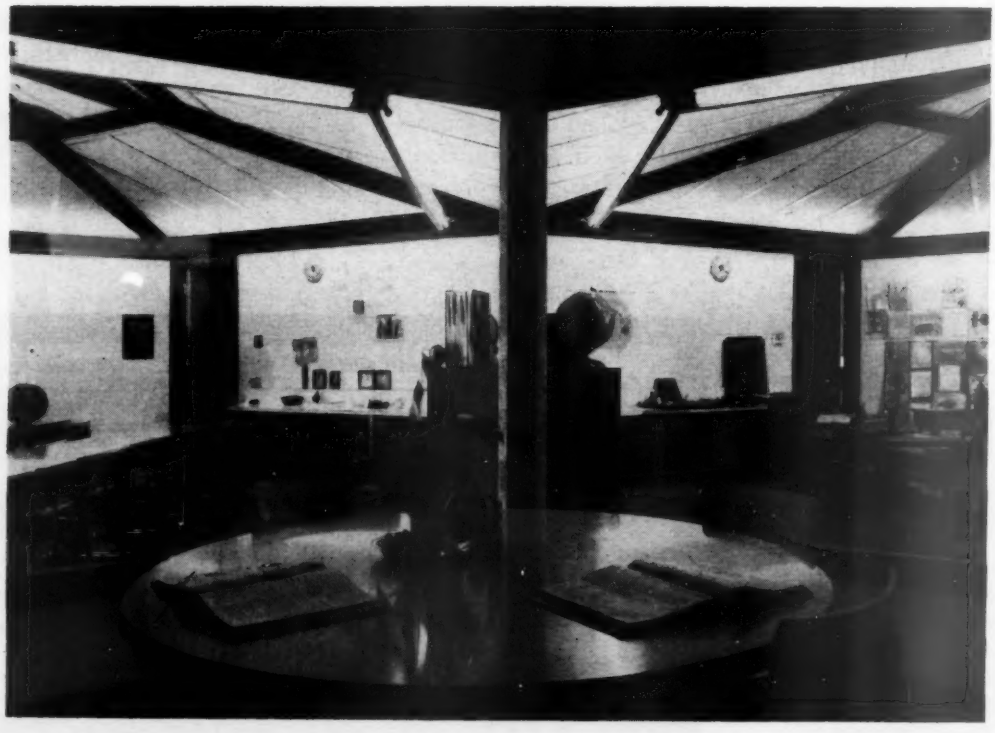
Private and Parochial School Construction in 1960

Type of School	Number Bldgs.	Expenditures
Elementary	205	$31,288,236
Secondary	180	43,853,702
K-12	14	5,700,072
Other*	82	14,538,758
TOTALS	481	$95,380,768

* Other: Gymnasium, swimming pool, administration, dining hall, kitchen, faculty residence, dormitory, infirmary, recreation halls.

Private and Parochial School Construction in 1958, 1959, 1960
Number of Buildings and Expenditures by Region

	1958		1959		1960	
Region	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures
South	159	$ 25,180,452	84	$10,326,798	81	$12,417,441
New England	84	9,593,850	87	8,483,448	111	18,936,882
Central	186	46,722,883	75	20,435,818	102	25,330,091
Middle Atlantic	151	35,499,444	112	21,049,901	125	29,491,034
West	45	5,500,795	39	3,113,426	62	9,205,320
TOTALS	625	$122,497,424	397	$63,409,391	481	$95,380,768



Industry and technology have contributed a variety of products and materials for use by educational planners and designers. (City and Country School, Bloomfield Hills, Mich., designed by architects Begrow & Brown.

Higher Education Picture

During the past five years colleges and universities have almost doubled their dollar output for new facilities. Dormitories continue to garner most of these dollars, with science buildings and academic classrooms next in volume.

The banner year for junior-community college development and expansion was 1959. A marked drop occurred in number of buildings and dollars expended for them during 1960. Dormitories lead junior college construction totals.

Combined statistics for colleges and universities and junior colleges reveal that $108 million went for furnishings and equipment. This represents an outlay of 12 cents for every construction dollar. The highest ratio of construction cost to equipment cost is for engineering buildings (24 cents for each construction dollar).

Higher education facilities have expanded in area by 58,509,840 square feet. Dormitories averaged 44,275 square feet per building, science buildings averaged 46,778 square feet each.

Figures available on air conditioning reveal that 23 percent of 1960's college and university buildings were fully air conditioned, 19 percent were partially air conditioned.

College and University Construction in 1960

Type of Building	Number Bldgs.	Expenditures
Academic Classroom	90	$ 85,687,431
Administration	39	28,537,228
Agriculture	17	6,934,774
Auditorium-Chapel-Theater	45	26,237,236
Dormitory-Residence	424	301,558,574
Engineering	24	25,197,401
Fine Arts	30	26,443,818
Food Service	55	30,528,542
Library	61	39,358,482
Medical Health	55	62,907,790
Physical Education	49	25,642,088
Science	152	141,243,408
Service Facilities	37	6,593,221
Student Center	58	44,139,239
Vocational Arts	21	7,810,485
All Purpose	22	7,160,152
TOTALS	1179	$865,979,869

College and University Construction in 1958, 1959, 1960
Number of Buildings and Expenditures by Region

	1958		1959		1960	
Region	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures
South	399	$153,061,848	347	$175,419,647	346	$213,781,612
New England	108	61,826,838	133	87,123,551	118	76,449,216
Central	347	258,438,318	330	252,000,043	284	250,690,223
Middle Atlantic	179	137,066,524	159	121,209,670	199	178,741,041
West	204	107,762,085	248	164,081,961	232	146,317,777
TOTALS	1237	$718,155,613	1217	$799,834,872	1179	$865,979,869

Junior College Construction in 1958, 1959, 1960
Number of Buildings and Expenditures by Region

	1958		1959		1960	
Region	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures	Number Bldgs.	Expenditures
South	71	$ 9,155,974	138	$22,274,131	90	$12,744,614
New England	13	1,359,528	9	2,040,433	15	4,402,405
Central	46	15,989,454	39	11,706,523	42	15,952,257
Middle Atlantic	24	5,862,706	27	21,686,801	41	24,900,394
West	93	25,008,819	95	31,308,598	37	13,703,337
TOTALS	247	$57,376,481	308	$89,016,486	225	$71,703,007

College, University, Junior College Construction in 1960
Furnishings and Equipment Costs

Type of Building	Number Bldgs.	Construction Cost	Total Furnishings & Equipment Costs	Ratio, Furnishings and Equipment to Construction Costs
Academic Classroom	109	$ 90,963,222	$ 11,169,818	12.3
Administration	51	33,540,282	3,649,345	10.9
Agriculture	17	6,934,774	462,232	6.7
Auditorium-Chapel-Theater	51	27,442,242	2,689,320	9.8
Dormitory-Residence	491	317,971,747	24,994,397	7.9
Engineering	26	27,424,420	6,576,907	24.0
Fine Arts	37	27,961,833	3,808,525	13.6
Food Service	58	31,224,548	4,142,470	13.3
Library	84	45,806,153	6,004,691	13.1
Medical Health	62	64,444,800	7,590,318	11.8
Physical Education	68	36,155,589	2,426,799	6.7
Science	178	150,572,143	21,453,644	14.2
Service Facilities	37	6,593,221	2,215,016	33.6
Student Center	79	50,498,929	7,408,701	14.7
Vocational Arts	21	7,810,485	1,663,489	21.3
All Purpose	35	12,338,488	2,081,649	16.9
TOTALS	1404	$937,682,876	$108,337,321	11.6

College, University, Junior College Construction in 1960
Building Area (Square Feet)

Type of Building	Number Bldgs.	Total Area (Square Feet)	Average Area (Square Feet)
Academic Classroom	109	5,106,140	46,845
Administration	51	2,181,465	42,774
Agriculture	17	340,823	20,048
Auditorium-Chapel-Theater	51	1,106,741	21,702
Dormitory-Residence	491	21,739,199	44,275
Engineering	26	1,392,094	53,542
Fine Arts	37	1,593,665	43,072
Food Service	58	2,334,084	40,244
Library	84	2,667,723	31,759
Medical Health	62	3,084,467	49,749
Physical Education	68	3,106,032	45,677
Science	178	8,326,542	46,778
Service Facilities	37	421,620	11,395
Student Center	79	3,747,225	47,433
Vocational Arts	21	437,726	20,844
All Purpose	35	924,294	26,408
TOTALS	1404	58,509,840	41,674

Junior College Construction in 1960

Type of Building	Number Bldgs.	Expenditures
Academic Classroom	19	$ 5,275,791
Administration	12	5,003,054
Auditorium-Chapel-Theater	6	1,205,006
Dormitory-Residence	67	16,413,173
Engineering	2	2,227,019
Fine Arts	7	1,518,015
Food Service	3	696,006
Library	23	6,447,671
Medical Health	7	1,537,010
Physical Education	19	10,513,501
Science	26	9,328,735
Student Center	21	6,359,690
All Purpose	13	5,178,336
TOTALS	225	$71,703,007

College, University, Junior College Construction in 1960
Air Conditioning Provided, by Percent of Buildings

Type of Building	Full Air Conditioning	Partial Air Conditioning	None
Academic Classroom	30%	28%	42%
Administration	31%	33%	36%
Agriculture	22%	39%	39%
Auditorium-Chapel-Theater	37%	22%	41%
Dormitory-Residence	12%	11%	77%
Engineering	17%	39%	44%
Fine Arts	38%	27%	35%
Food Service	22%	22%	56%
Library	46%	15%	39%
Medical Health	39%	22%	39%
Physical Education	4%	18%	78%
Science	27%	26%	47%
Service Facilities	—	3%	97%
Student Center	39%	22%	39%
Vocational Arts	20%	20%	60%
All Purpose	17%	11%	72%
TOTALS	23%	19%	58%

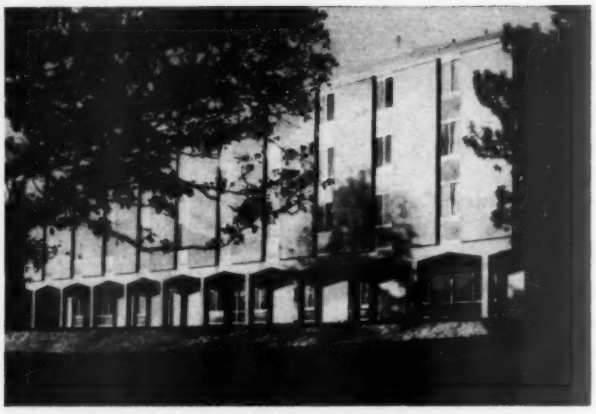
The general picture for junior college construction in 1960 is a drop in both numbers of buildings and expenditures for them since 1959. New library, shown on this page, was designed for Gwynedd Mercy Junior College, Gwynedd Valley, Pa., by architects Nolen and Swinburne of Philadelphia.

Federal Aid Proposal

How does the educational construction picture of past years measure against the government's proposal of Federal aid to public schools and higher education? Actual expenditures by public schools in the last three years were 8.25 billion dollars for 23,614 buildings. If local and state financing can continue at this rate or better during the next three years, Federal aid, if actually granted by Congress and applied to construction, should augment the construction outlook by almost one-third. Peak years are ahead then for public school construction, and higher education and private and parochial schools are also aiming upward as enrollments in all categories are estimated to attain huge gains.

A Matter of Quality

Quantities and sum totals are the focus of attention at the moment, but the long pull by architects and educators for quality educational construction is not completely buried under the avalanche of dollars, cents and enrollment statistics. After more than a decade, school and college building designs here and there continue to show creativity, ingenuity, and talent; and there is no indication that they will decline into the morass of standard patterns or stock plans.



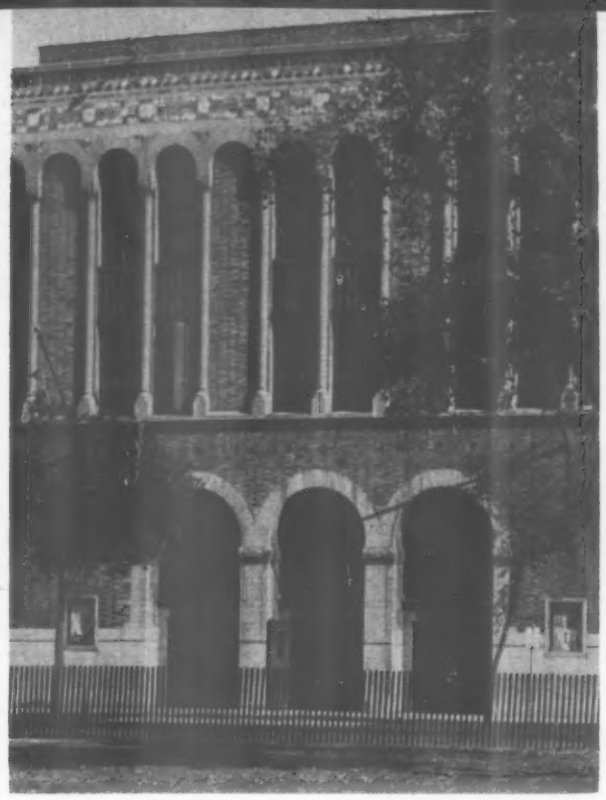
Colleges and universities constructed 424 new dormitory buildings during 1960, accounting for more than one-third of all new buildings for higher education. New structure on campus of Washington University, St. Louis, Missouri, is dormitory for women. Architects are Hellmuth, Obata & Kassabaum Inc.

So long as educators continue to move forward to improve courses of study, as architects contrive new ways to express educational theory with living buildings, and as industry moves ahead with new products and materials, educational construction will continue to be a vital and vigorous part of American life and growth—not to be measured in dollars and cents alone.

Ten Year Summary of Educational Construction for Years 1951 through 1960

	1951	1952	1953	1954	1955
Total Number of Buildings	6440	5846	7560	9147	9246
Public School	4707	4591	6428	7567	7836
Private & Parochial	336	166	185	687	371
College & University	1198	865	789	728	814
Junior College	199	224	158	165	225
Total Expenditures	$2,327,528,366	$2,104,300,932	$2,250,390,251	$2,854,757,059	$3,028,342,577
Public School	1,546,725,613	1,546,835,958	1,830,301,255	2,264,376,583	2,440,041,708
Private & Parochial	89,428,414	25,230,193	31,474,364	108,980,540	61,007,514
College & University	647,164,294	479,841,721	360,601,252	446,331,381	482,514,756
Junior College	44,210,045	52,393,060	28,013,380	35,068,055	44,778,599

	1956	1957	1958	1959	1960
Total Number of Buildings	10,075	9689	11,299	9301	8930
Public School	8211	7841	9190	7379	7045
Private & Parochial	546	721	625	397	481
College & University	1012	919	1237	1217	1179
Junior College	306	208	247	308	225
Total Expenditures	$3,214,374,596	$3,420,509,334	$3,950,147,812	$3,572,226,922	$3,624,942,411
Public School	2,547,572,920	2,645,310,685	3,052,118,294	2,619,966,173	2,591,878,767
Private & Parochial	104,444,783	169,426,998	122,497,424	63,409,391	95,380,768
College & University	501,754,331	555,779,874	718,155,613	799,834,872	865,979,869
Junior College	60,602,562	49,991,777	57,376,481	89,016,486	71,703,007



One of Chicago's older educational buildings, Hess School, will be enlarged with a new addition.

Chicago's Educational Plant Program

by David J. Heffernan
Assistant Superintendent of Schools, Chicago, Illinois

Mr. Heffernan holds an M.A. degree from DePaul University. He has been associated with the Chicago Public Schools since 1947, as an English teacher, director of student activities and since 1956 as assistant superintendent in charge of school, community, press and human relations.

SINCE 1953, the City of Chicago has constructed 75 new schools and 64 additions, and has acquired 117 sites. Forty-seven schools and 45 additions are almost ready for occupancy or are under way. Thirty-eight sites have been recently acquired, approved or proposed for acquisition, and approved for condemnation. The total building program represents a budgeted item of $175 millions and constitutes the major part of a $200 million bond issue approved by the Illinois Legislature and the voters of Chicago. Four bond issues, for $50 million each, necessitated four appearances before the Legislature and four referendums to voters.

The prelude to all this building activity goes back to the end of World War II. The Chicago Public Schools faced major enrollment increases from three causes—rising birth rate, mobility of returning soldiers and their families from homes within the city to peripheral areas that had been prairies, and the immigration of new workers and their families to the heart of the city.

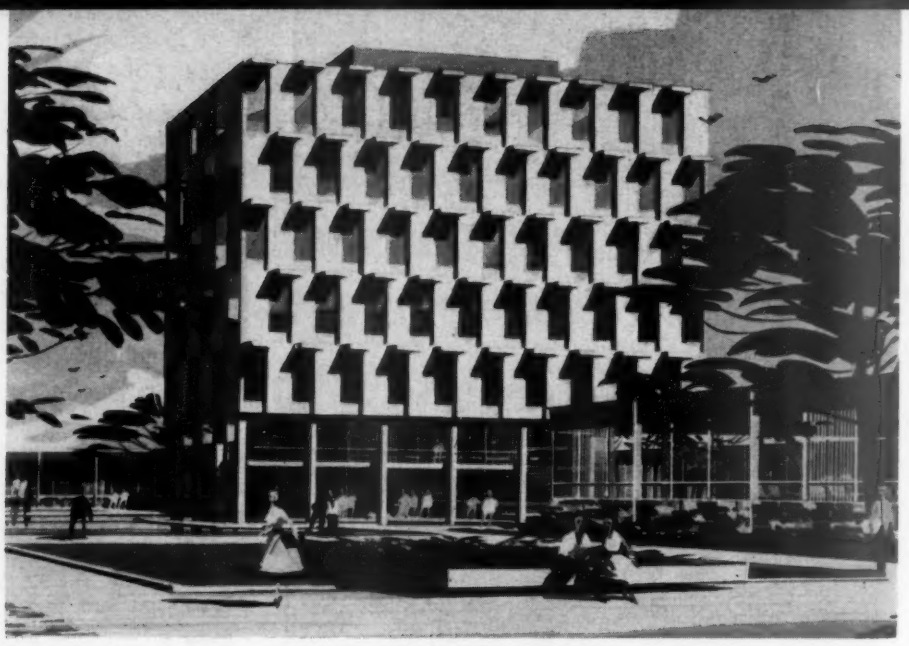
It was not until 1953 that Chicago began to move to any degree in meeting its building needs. In the meantime, the three-fold population problem had been at work and children were crowding the schools.

The major task facing Dr. Benjamin C. Willis, General Superintendent of Schools, when he arrived in Chicago in 1953, was the magnitude of the building program required to fill the widening gap between enrollments and facilities. It was necessary for him to convince citizens and the Board of Education of the rightness of a whole new philosophy for building schools. The Board maintained an architectural department which had its own conception of architecture and a limited staff for the task ahead. New ideas and new examples of architectural creativity were wanted.

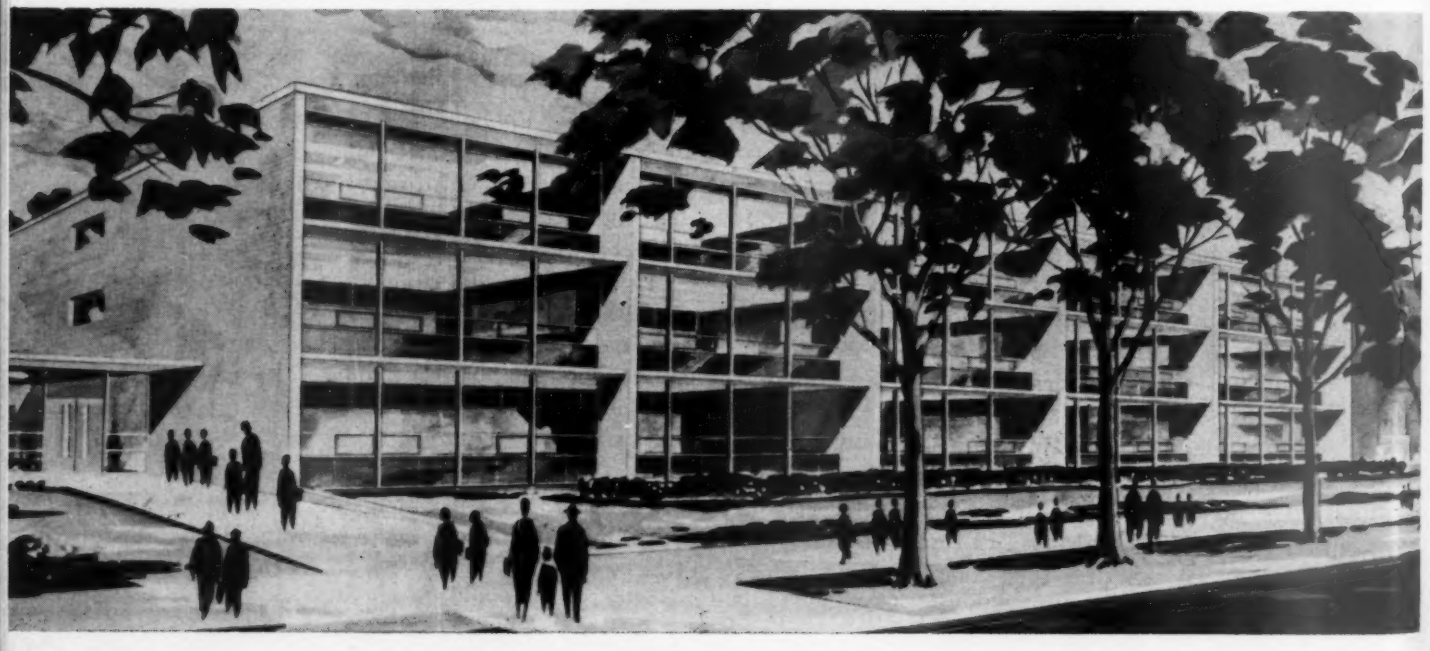
The old style, high-rise school for great numbers of students, no play areas and absence of landscaping had to give way to efficient, functional, one story elementary schools, limited to capacities of 1200 whenever possible, with adequate play space and landscaping. High schools had to be designed for a maximum capacity of 2200.

To meet these demands, the Chicago Board of Education employed eighteen outside architects (the number has since grown to thirty-four) and

New North Side Teachers College is multi-story with projecting sun shades. Building was designed by Perkins and Will, Architects-Engineers.



Public school at 78th and Lawndale Avenue is a low structure with parking provided on the site (photo left). Designers were Johnson & Johnson, Engineers-Architects, Inc. Another new project is the proposed addition for the Hess School (below). Associated architects are Samuel Arthur Lichtmann and Loewenberg & Loewenberg.



Chicago Public Schools Photos

Mather High School is a spread-out plan, with one story classroom units (above). Architects are Loebl, Schlossman & Bennett. Robbins Court School, at right, was designed by Bertrand Goldberg Associates for 930 pupils. Classroom units have vaulted roofs of sprayed concrete.

gave them freedom to design new structures according to educational requirements. The Board's architectural department also worked on plans, within the framework of the specified site and space adequacy.

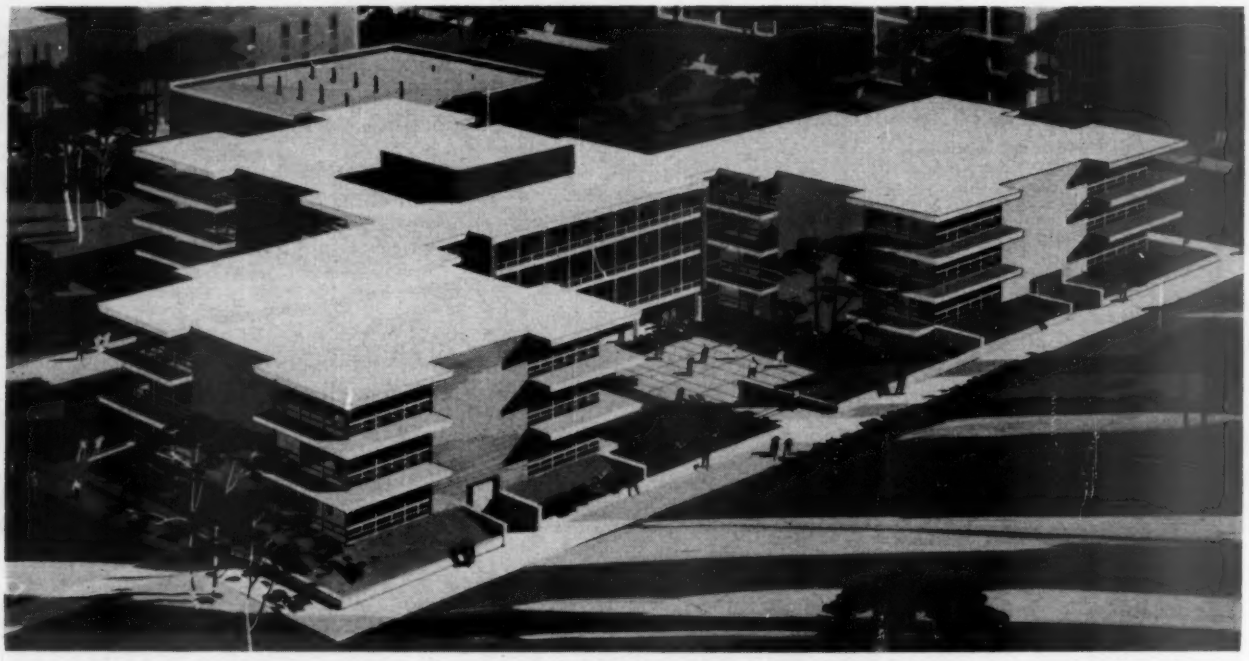
Land values, as a cost factor, were determined by a joint Chicago Park District-Chicago Public School land-use arrangement. Schools share in park developments for beauty and play, and the recreation department of the parks uses schools for fieldhouses and games. This cooperative plan has meant much to the city in efficient and economical use of land and buildings.

All this effort required time. With a four-year building lag to overcome, additional steps had to be taken. A believer in flexibility, Dr. Willis did not hesitate to authorize conversion of a high school into a grade school, nor renovation of a partially used high school into a joint facility for high school, junior college and police training. Buildings adaptable to educational purposes were purchased and changed into schools.

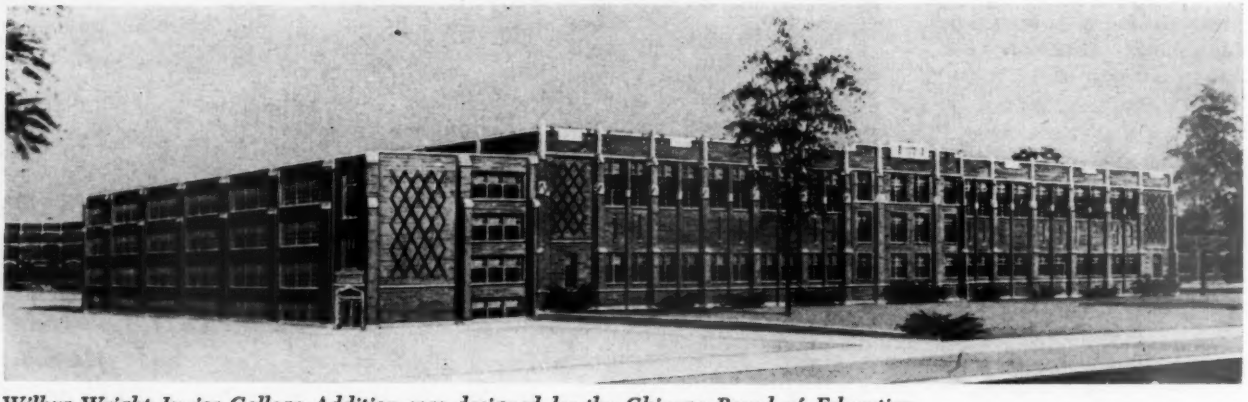
The first new school construction was planned for vacant properties in peripheral areas. There was no uniform planning for these areas. The school sites were selected quickly or new homes would have soon covered every available parcel of land.

Building Within the City

Simultaneously, it was necessary to start building within the heart of the city. Here, two factors were involved. One, slums were being replaced with high-rise housing, and schools had to be built in anticipation of enrollment within these projects. Two, with population mobility from within the city to the suburbs, newcomers arrived and turned single family dwellings into multiple housing units. In one area, school enrollment changed



Limited site of Byrd Elementary School, Perkins and Will, architects, meant a multi-story building. Structure is set back to form a court.

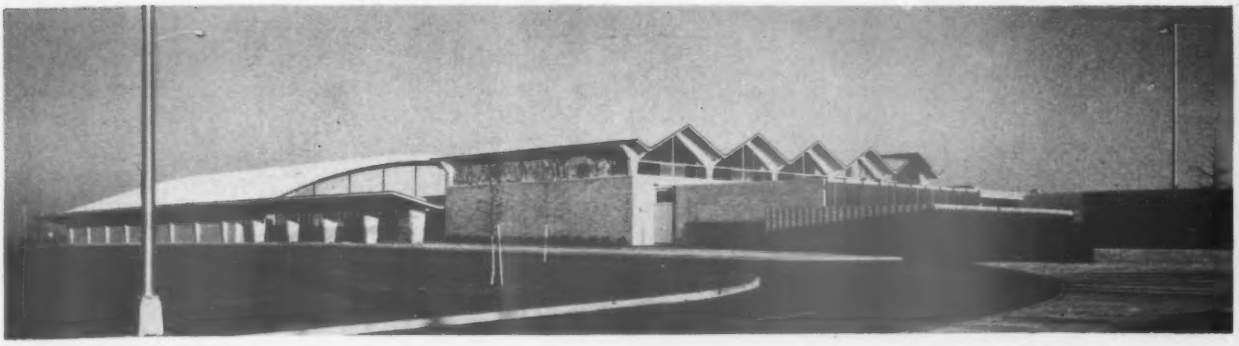


Wilbur Wright Junior College Addition was designed by the Chicago Board of Education.

within three years from 1200 students to approximately 3000. On any Monday morning, school personnel were processing 100 new children.

Planning for the central area of the city was carried out by a number of civic agencies, and all their activities had to be coordinated. It was also necessary to anticipate where children from the slum clearance area were going to arrive next as students. Whether it was the multiple-unit areas or the slum clearance areas, Chicago faced a major task in condemnation for school purposes. The RIGHT sites had to be picked in anticipation of where children would live and go to school.

The size and scope of the Chicago school building program indicate how much has been done to provide educational facilities where and when they were needed. Creative, functional buildings have arisen. Many educational plants are now under construction. More are planned. Planners cannot yet relax in their efforts to overcome the complex school plant difficulties which a big city district inevitably faces.



Arch over gymnasium and swimming pool is concrete pierced with plastic bubbles. Folded plate roof covers cafeteria.

Carl Sandburg Junior High School

by G. Harold W. Haag and Paul d'Entremont

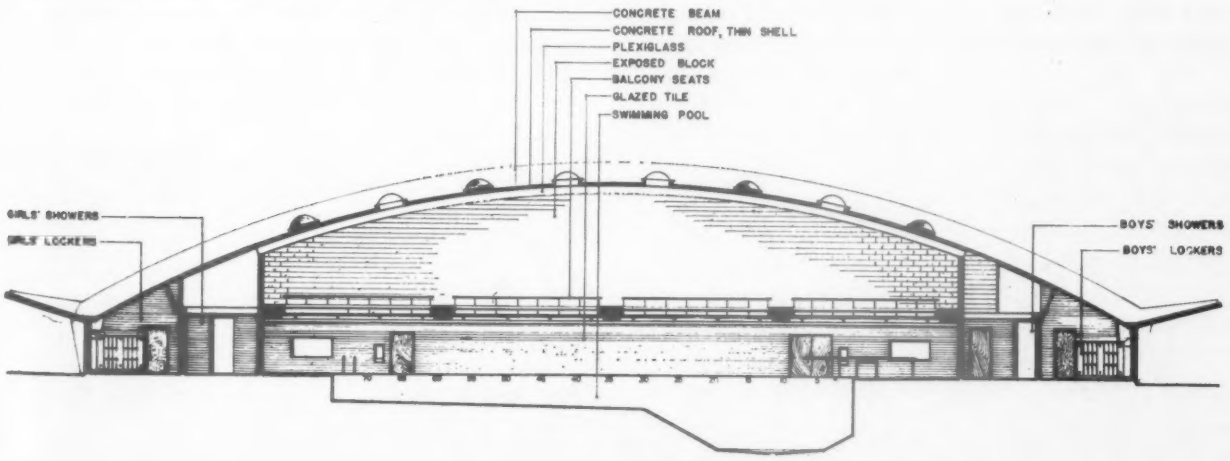
AIA, Haag & d'Entremont, Architects, Jenkintown, Pennsylvania

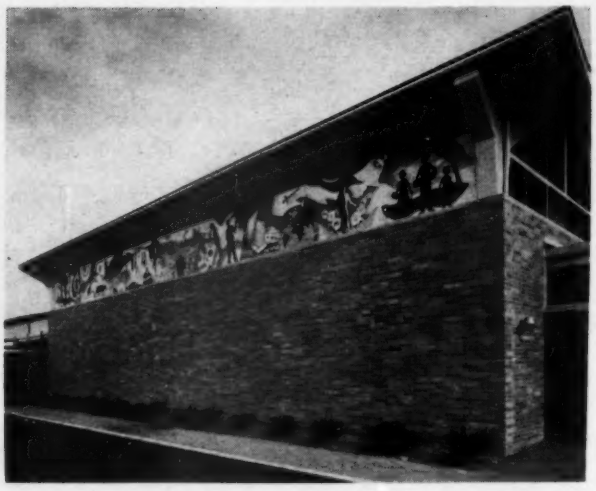
THE SUPREME TEST for any new building is how well it stands up under daily use. The administrators, staff and students at the Carl Sandburg Junior High School, Levittown, Pennsylvania, are unanimous in rating their new school as passing this test with a high score. The building is number six designed by architects Haag & d'Entremont, Jenkintown, for the Neshaminy School District.

A corridor joins the junior high to adjacent Albert Schweitzer Elementary School, an earlier project by the same architects. Both schools share a common auditorium-cafeteria, library, teachers' facilities and locker room.

Pre-design conferences and exploratory discussions established the particular needs of the student body, and the architects set forth design innovations to meet these needs. For example, it was decided to have combination rooms for English and social studies which would be larger than the ordinary classroom. The larger area would enable one teacher to integrate subject matter while panel discussions or small groups operated simultaneously within the room. There are small, private conference rooms leading from the main classrooms. Here students can prepare work together without disturbing others.

Concrete arch spans 158 feet with natural sunlight entering through bubbles.





Mosaic mural, above, depicts the development of man's knowledge. Music room, below, has door at rear.

Lawrence S. Williams, Inc. Photos

In the music department, the sunken music rooms have doors at the rear to permit persons to enter or leave without disturbing those at work.

For mathematics and science, it was felt that permanent laboratory setups would waste space, since these subjects involve participation rather than teacher demonstrations at the junior high school level. Mobile laboratories were provided, and their versatility has proved to be a valuable asset to the mathematics and science curriculums. Science rooms are back to back, with a storage room at the center for use by two classrooms.

Venetian blinds double as blackout shades for visual aids presentations. Good quality projection is possible in each classroom.

The junior high school accommodates 850 pupils and was constructed at a cost of $2,500,000 ($15.40 per square foot). A wide concrete arch, spanning 158 feet, covers the swimming pool and gymnasium. Plastic bubbles, four feet in diameter, pierce the arch and let in natural sunlight. Similar bubbles admit daylight into the wide corridors. A folded plate roof covers the cafeteria. The entire structure is reinforced concrete with brick and turquoise panels for contrast. Glazing is clear at vision level, tinted glass above.

Each classroom is painted concrete block with asphalt tile flooring and acoustical tile ceilings. Natural wood panels in corridors and classrooms give an informal warmth to the entire school. Heating is by hot water with unit ventilators throughout.

The total site size for both schools is 34 acres. The schools are set near each other to allow room for playing fields for the junior high and a private play area for the elementary school.

The approach to the junior high school is heightened by a mosaic mural set into the outside wall. This renaissance technique, using contemporary tile materials, depicts the development of man's knowledge.

Dr. Oliver Heckman, regional superintendent of the whole district, has noted that the architecture of the Carl Sandburg Junior High School, as well as that of the other new schools, has inspired tremendous pride and community spirit. The school district, which includes only a part of Levittown among its population (Levittown actually spills into three districts) has grown from 300 students in 1951 to 8700 in 1960. It expects to have 10,000 by 1970. Economy prompted the use of common facilities for the junior high and elementary schools, but crowding has been avoided thus far.

Classrooms at Novato High School were planned for the teaching of specific subject matter material in flexible areas.

Secondary School Design in Retrospect

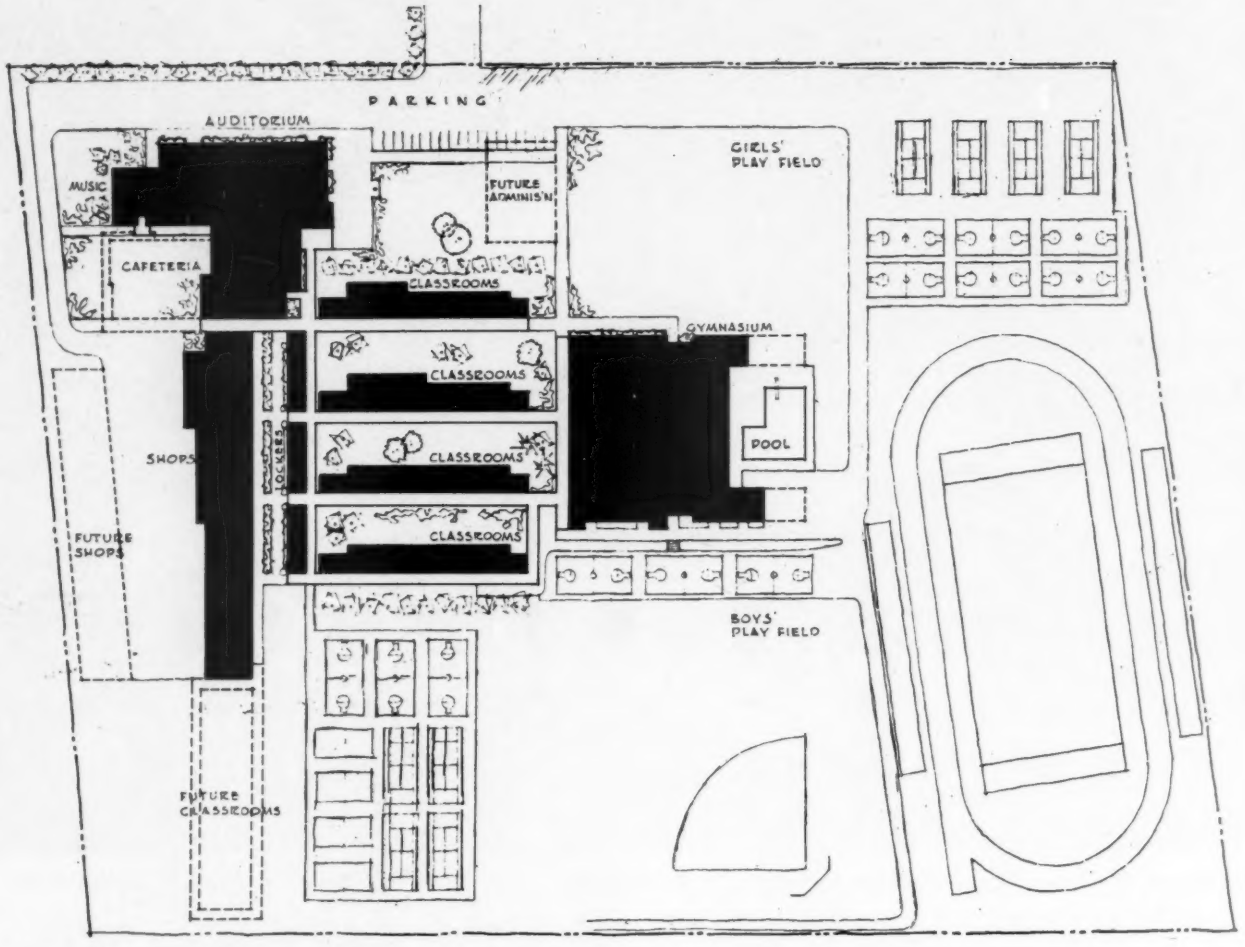
by John Lyon Reid

FAIA, Reid Rockwell Banwell & Tarics, Architects and Engineers, San Francisco, California

Mr. Reid was an associate professor in Architecture at Massachusetts Institute of Technology from 1932 to 1940, and lectured at the University of California during 1946 and 1947. He has maintained his own practice since 1946. Mr. Reid has B.A. and M.A. degrees from the University of California and a Master in Architecture from M.I.T.

NO ONE CAN predict what really lies ahead for secondary school education except the certainty of change. Schoolhouses designed and built for today's needs will be in their prime thirty or forty years from now—how can we design them to be as useful then as they are now?

The herculean effort to surmount schoolhouse deficits gives educators and architects little time to reflect on the course of secondary education, but analyses have been made of what is now doing and what will be doing in years to come. I, myself, was privileged to be associated with Archibald B. Shaw in preparing the "Random Falls Idea," a documentary which looked ahead to secondary education of the future. More recently, the National Association of Secondary-School Principals, under the guidance



Relatively small site of the Senior High School at South San Francisco necessitated two story classroom wings. A total of seven construction contracts will bring the project to completion.

Classroom wings of South San Francisco Senior High School are at center, gymnasium is at left, auditorium at far right. Construction is steel and transite curtain wall.

Courts separate the four classroom wings of the South San Francisco School designed in the then popular finger plan.

of J. Lloyd Trump, added to many other secondary education predictions with its *Images of the Future.*

Such critical appraisals give us some idea of the trend of change. We can also trace this same change in terms of bricks, mortar, glass and metal by examining schoolhousing constructed since World War II. We will see how educational patterns caused changes in secondary school design from finger and campus plans to multi-partitioned loft designs and now to plans with less and less interior division.

The sudden rise in numbers of school children immediately after the war was regarded by all of us as a critical but transitory emergency. The first burst of school plant construction to accommodate these children consisted largely of new elementary schools. In California, school design fell into a definitive pattern with strong emphasis on the single loaded corridor, bilateral lighting, and radiant heating. Typically, five to seven identical or similar classrooms were grouped in building wings. Each classroom housed a self-contained activity and these in turn required central service areas—library, administrative and health offices, and a room for assembly and feeding which became known as the "multi-purpose room." All this, while strongly characteristic of California elementary school design, was found in other parts of the nation as well.

Pressure for high school construction to meet the new population of teen-agers began to be felt in the early Fifties. By this time the pattern of elementary plant design was well established. The experience gained and the lessons learned from new elementary schools influenced early secondary school construction. Single loaded corridors and wing plans blossomed in high school designs.

Three High Schools

The Senior High School at South San Francisco was one of the first secondary schools designed by our office. A relatively small site necessitated two story classroom wings, but otherwise the school characterizes much of the work then being done throughout the state. The plant was designed to house twelve to fourteen hundred students in separate units—four two story academic classroom wings, boys' and girls' gymnasium, music department, auditorium to seat one thousand, and a counseling, health and general administrative office area. Only the administrative area remains to be constructed and, when it is completed, seven construction contracts will have been entered into by the South San Francisco Unified School District to finish its high school.

Such long-range planning permitted the school district to make a relatively small beginning, adding to the plant as population growth dictated. This design approach is evidence of the disbelief with which most of us faced the unprecedented population increases.

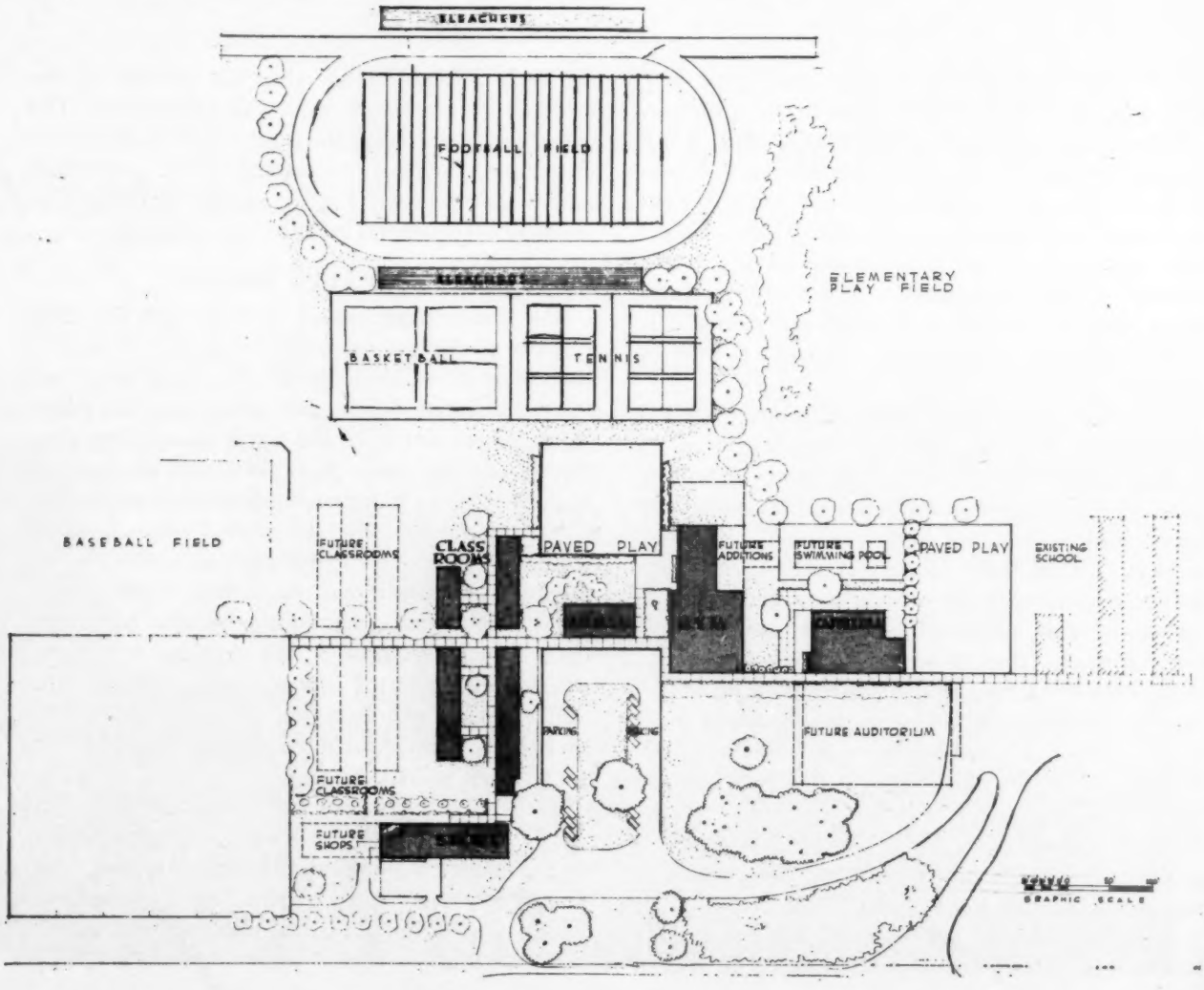
The San Lorenzo High School, constructed at Felton by the San Lorenzo Valley Unified School District, Howard Wire, superintendent, is another secondary school designed as a group of separate buildings, with single loaded corridors and building wings one classroom in depth. This project combined a junior and senior high school on the same site, sharing common facilities of library, administrative offices, cafeteria and gymnasium, locker and shower rooms. Shop, arts and crafts, and music facilities complete the group. Here, again, is reflected a hesitant, tentative approach to the population phenomenon. The plant can be added to in small increments as enrollment growth justifies. Five separate construction programs have brought the school to its present size.

The Novato High School, constructed for the Novato Unified School District, William J. J. Smith, superintendent, is similar in character to the above two schools. All three buildings are located in varying climates and in communities which differ considerably. South San Francisco is an urban area, the center of industrial activity; Felton, in the San Lorenzo Valley of the Santa Cruz mountains, still bears a summer resort air although rapidly being settled by workers from nearby Santa Cruz, Los Gatos and San Jose; Novato is a suburban community and most of its people find employment in nearby San Francisco.

We attempted to relate the character of each school to the character of its community. Exterior materials vary from domestic scale brick masonry at Novato to redwood board and batten at San Lorenzo to steel and transite curtain wall construction at South San Francisco. Illumination in each is different. South San Francisco and San Lorenzo are bilaterally lighted for natural illumination. Novato has low nine-foot ceilings in the classrooms and windows designed not for daylighting but to provide a view of the outdoors. Lighting is by fluorescent fixtures.

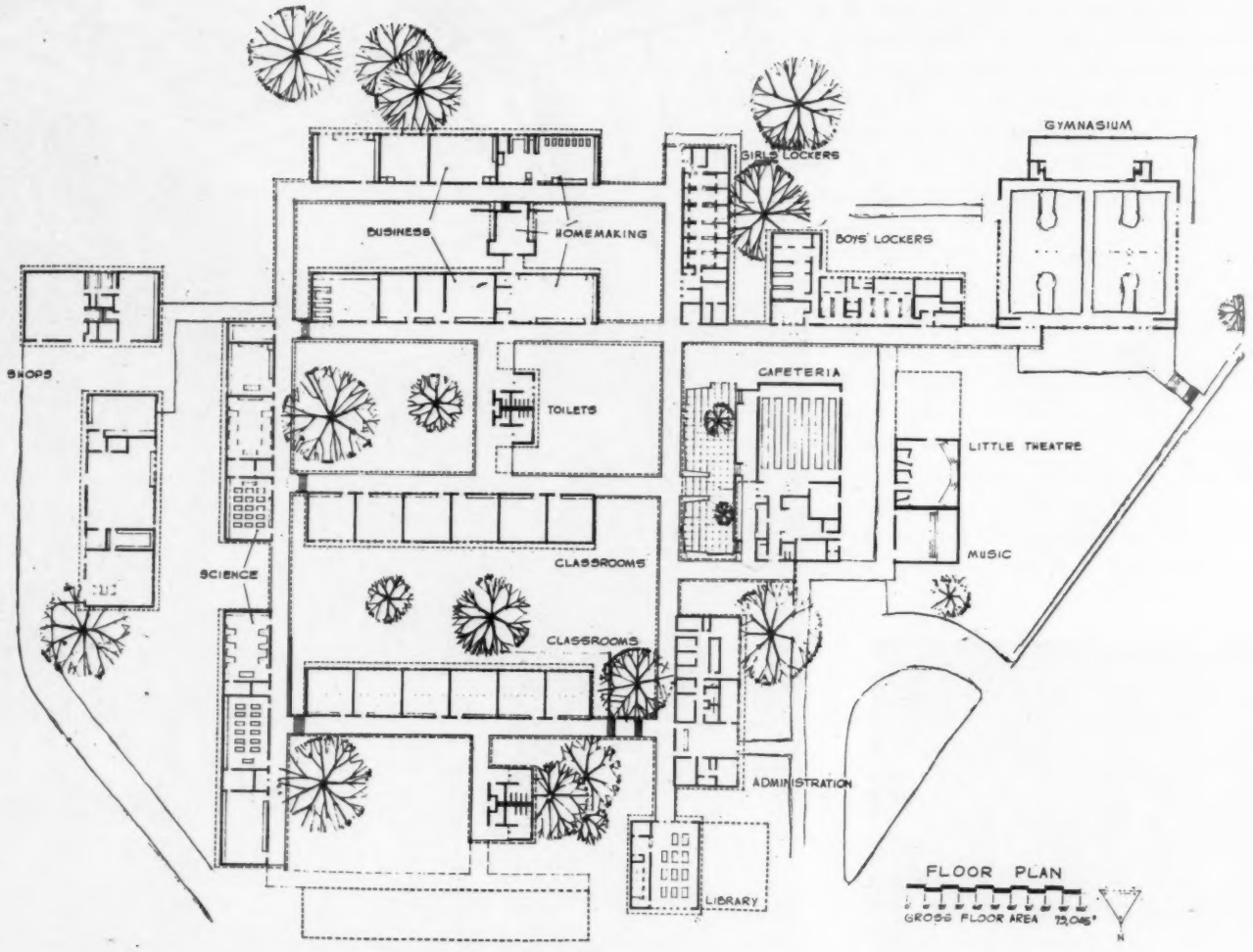
In all three schools, classrooms are planned for

San Lorenzo High School, Felton, Calif., was designed as a group of separate buildings.



Much use was made of wood in construction of the San Lorenzo High School. Gymnasium interior, above, has skylights to transmit natural light to interior. View at left is cafeteria exterior.

The San Lorenzo project combines a junior and senior high school on the same site. Wings are one classroom in depth.



Novato High School is constructed of domestic scale brick masonry. Classroom ceilings are a low nine feet and windows are not designed to transmit daylight.

the teaching of specific subject matter material. Maximum flexibility is facilitated by design and construction. All partitions in academic areas are non-structural and can be moved. However, there is a limit to rearrangement possibilities of the interior space; the maximum width of any room from window wall to corridor wall is approximately thirty feet. The maximum dimension, longitudinally, in the classroom wings is limited only by desirable proportions of depth to width. The separated building wings hinder close relationships and intercommunication between rooms or departments.

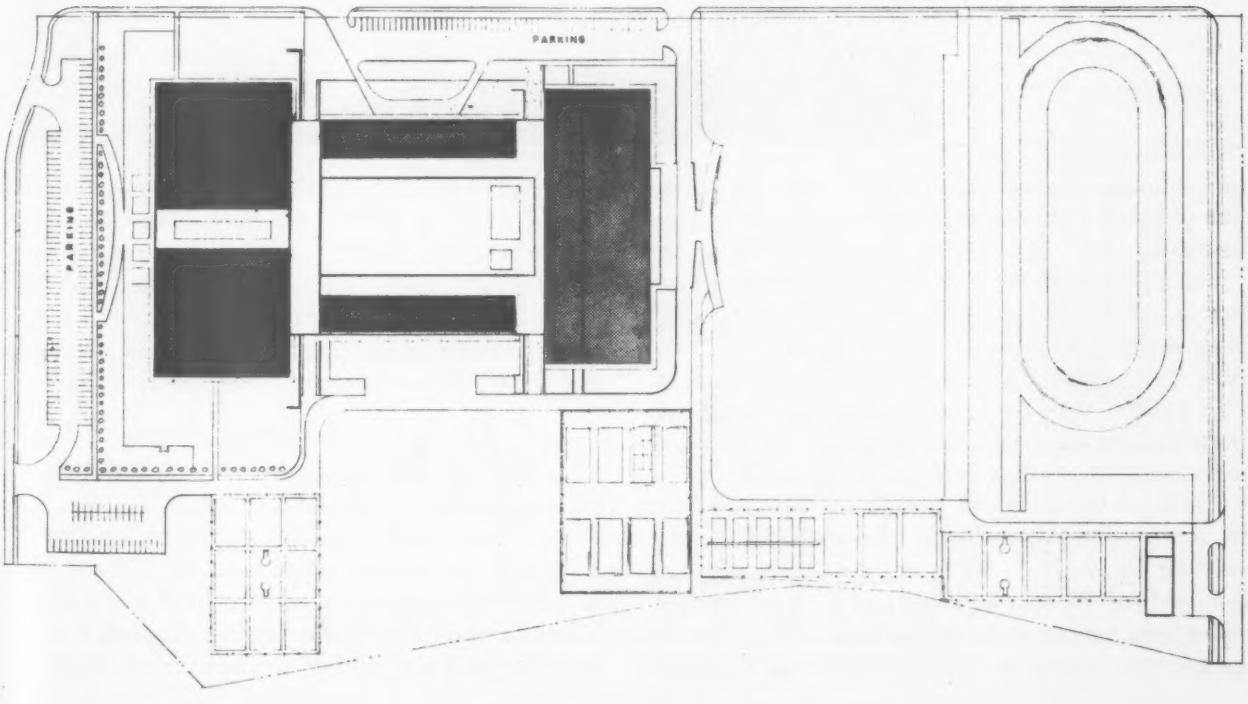
In the early 1950's there was a discernible search for meaningful relationships between subject matter divisions of the curriculum. There was also a tendency to turn away from subjects taught in relative isolation. If this trend in teaching were to gain favor, it seemed necessary to design school plants which would facilitate a close relationship between subject matter areas and between teachers and departments.

Hillsdale High School

We were thus led to search for larger floor areas where disconnected buildings could be combined into a single unit with easier communication between rooms and departments. This would allow the development of space and working relationships in all directions on a scale not yet realized in wing plan designs. Early in 1952 we began work on a problem of designing a space of considerable dimension, as free as we could make it of structural elements, where rooms could be any size that present or future programs would require. This pointed the way to design of the Hillsdale High School in the San Mateo, California, Union High School District under the superintendency of Thomas F. Reynolds. Construction began in 1954 and the building was occupied in September, 1955.

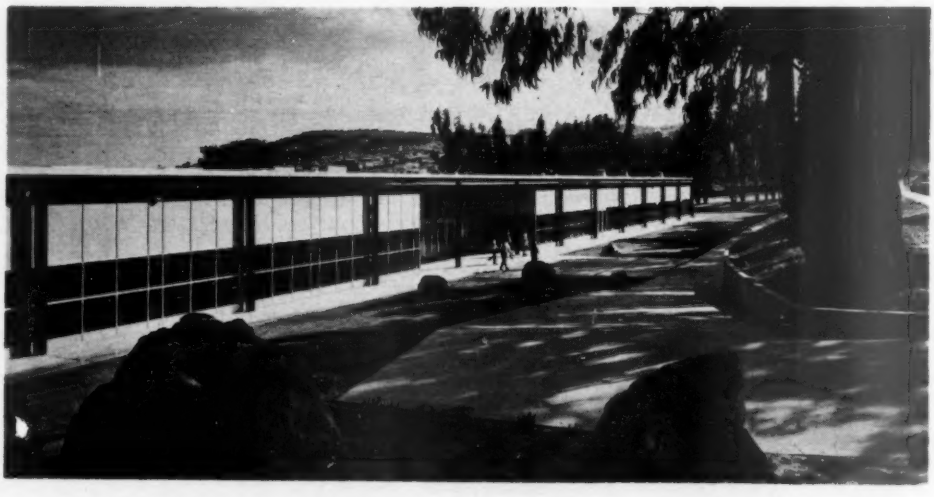
Essentially, the Hillsdale High School plan has two academic areas, each approximately two hundred feet by two hundred in size. The roof is supported on a grid of columns twenty-eight feet center to center in both directions. In an area of this dimension it was impossible to provide natural illumina-

Academic area at Hillsdale High School measures 200 feet by 200 feet (shown at right before installation of partitions). School has two of these areas (plot plan below).



Natural illumination is provided at Hillsdale High School by a system of overhead prismatic glass blocks. All partitions within the school (floor plan at right) are non-structural metal units.

Roger Sturtevant Photos



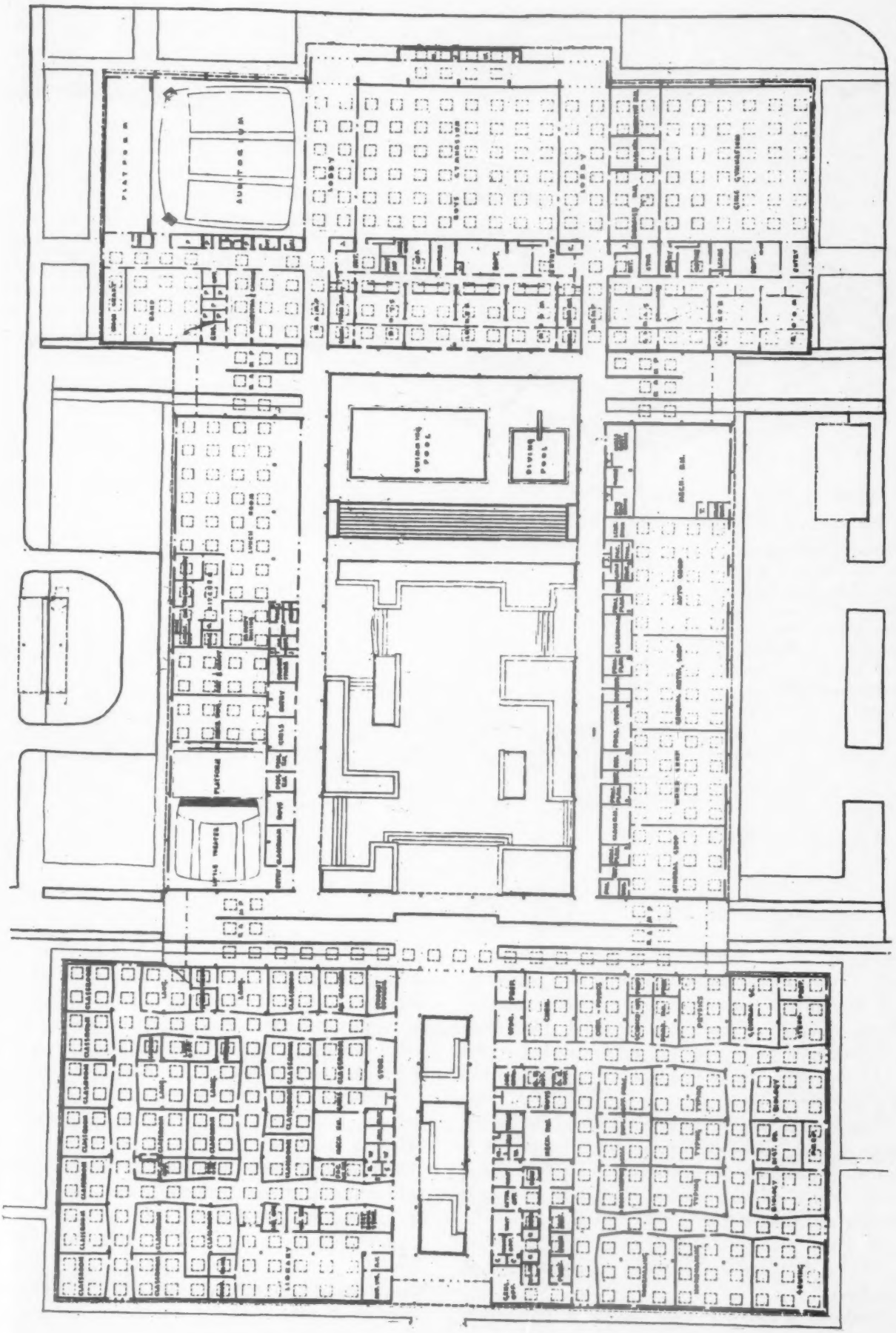
tion through windows on the perimeter wall. A system of natural illumination with overhead *Top Lite* prismatic glass blocks was developed. Since we could not depend on windows for natural ventilation, a mechanical ventilation system was devised with supply and exhaust outlets located on a regular grid pattern. Artificial lighting with fluorescent fixtures was arranged on the same basis. All partitions are non-structural metal units. They are attached to the ceiling grid and to the floor.

Thus we were able to give the school district a space divisible into seven feet by seven feet in the smallest dimension, and up to approximately two hundred feet by two hundred feet in the maximum dimension just by moving partitions. And there is no need to change light and ventilation installations. Space of this kind does not obstruct growth or change in curriculum or teaching methods.

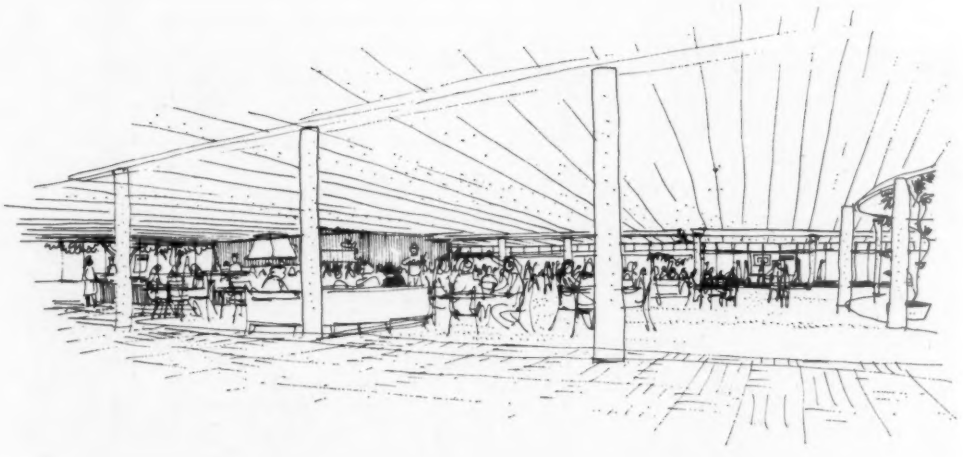
The Hillsdale High School won ready acceptance by its administrators and staff and we now find ourselves designing high school number four for the district. Basic plant concepts have not changed, and we are able to improve on details in each plant.

Design at Andrews, Texas

In 1958 we were given the opportunity to work with the Andrews Independent School District, Andrews, Texas, under the leadership of Mr. Truett A. Roach, the district superintendent. Formulation of educational specifications for a new secondary school was carried out under Superintendent Roach's guidance during six months of extended



The new High School at Andrews, Texas, was planned to foster and facilitate interaction and intercommunication of students and teachers. Dome shelters a student concourse.



meetings. The entire community participated with every professional and social group represented. Educational consultants from the University of Texas at Austin, Glenn Barnett and William Barron, attended these meetings and provided expert help. Robert F. Olwell was in charge of the project for the architects.

The educational program encouraged the development of clearly sought relationships between such learning activities as mathematics, physics and chemistry. The social sciences, language arts, journalism and drama were to have stronger ties. The new school plant was to foster and facilitate interaction and intercommunication of students and teachers.

Andrews is near the west border of Texas, in a flat, semi-arid area where wind and blowing sand are apt to prevail. To combat these elements the first floor slab of the one-story building was elevated approximately five feet above ground level. What would have been an open student court in a different climate became, in Andrews, a covered and enclosed area under a dome. We call this the student concourse. Here are lockers, student store, cafeteria and snack bar. School assemblies, social affairs, dances, lectures, rallies and concerts can be held under the dome. The entire concourse is used for circulation, lounging and conversation.

Bids were opened on June 3, 1960, and a construction contract was awarded to the Warner Construction Company at a cost of $2,672,100. Construction is scheduled for completion on January

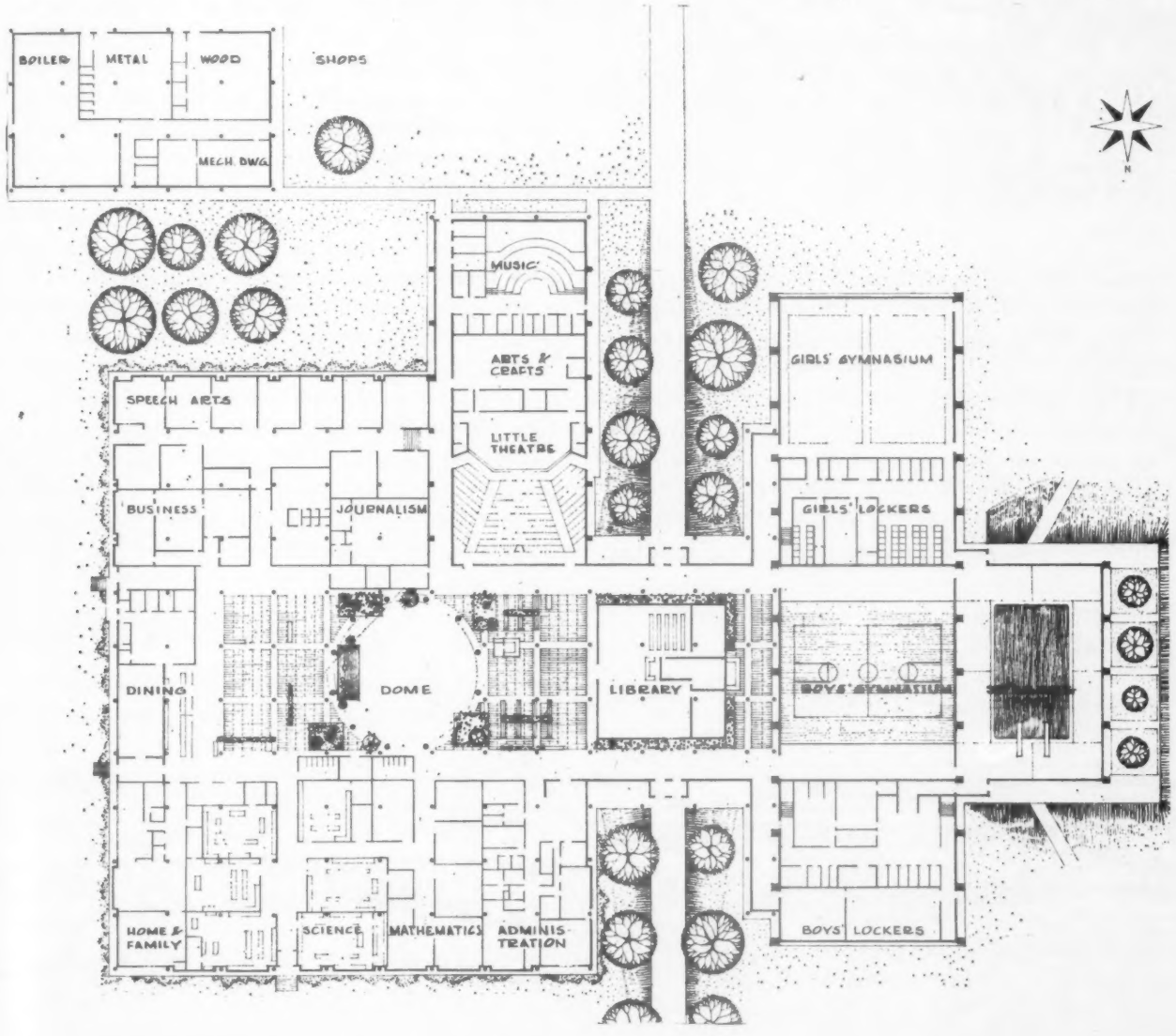
1, 1962. The present capacity of the plant is 800 to 850 high school students with planned expansion to 1,200.

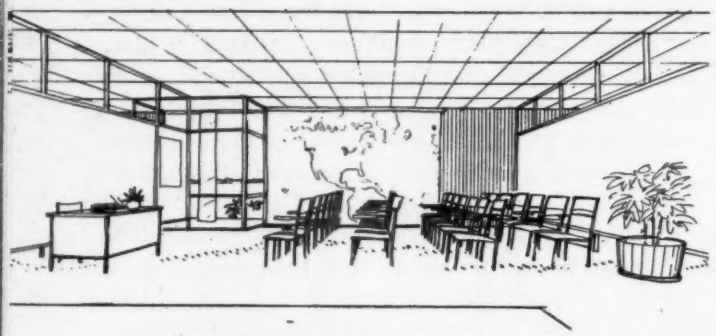
The floor and below grade supporting columns are concrete. Poured circular concrete columns support a system of precast beams which in turn support roof members of prestressed concrete tee beams. Walls are brick masonry.

In concept Andrews High School is basically a loft type plan but it differs considerably from Hillsdale High School. At Hillsdale the room partitions are used primarily for acoustics and are treated to achieve a sound reduction of approximately 40 decibels. At Andrews, the program requires easy communication between rooms and departments and all interior doors have been omitted, save in the chemistry laboratory where doors were installed to limit the spread of chemical odors. Partitions consist of wooden doors, three feet wide by seven feet high, joined together by splines. A glass screen closes the partition from a height of seven feet to the ceiling. One side of each room is partially open with a six foot space in the partition. This permits a great deal of openness throughout the plant.

This same openness presented a problem in acoustics. It was desired to keep the ambient noise level at approximately 37 to 38 decibels. To achieve this, carpeting has been used throughout all academic areas, except in science rooms and portions of homemaking where spillage possibilities dictated the use of vinyl asbestos floor tile. The carpeting, together with limited applications of acoustical tile on walls will maintain the desired ambient noise level, according to calculations of our acoustical engineer, Dariel Fitzroy. Past experience of the

In concept Andrews High School is basically a loft type plan but permits easy communication between rooms and departments.





Flexibility of interior space design at Andrews required elimination of all inside doors except in chemistry lab. Floors are carpeted throughout, although science and part of homemaking have vinyl asbestos floor tile.

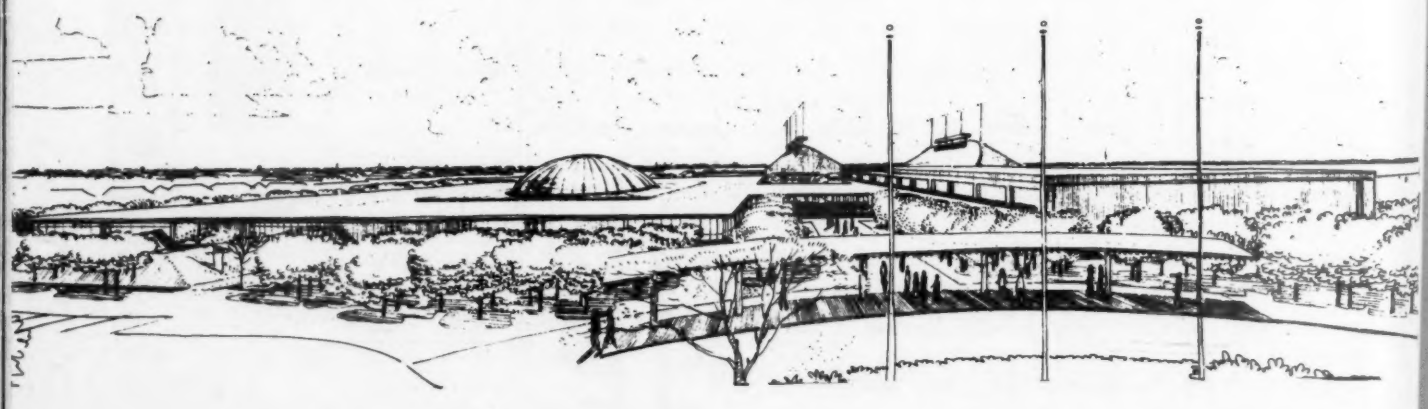
school district, together with our own research, leads us to believe that the cost of maintenance and upkeep on the carpeting will come to a surprisingly low figure.

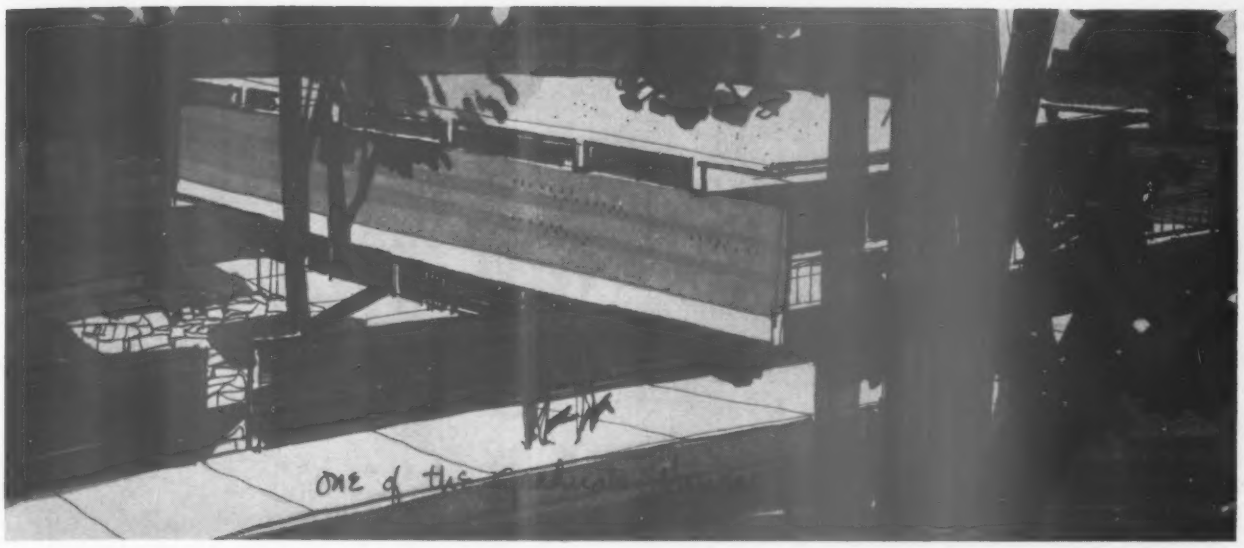
The Andrews High School interior is artificially ventilated with unit type equipment, but complete air conditioning is provided. Air conditioning will maintain a comfort level with six to eight air changes, as contrasted to eleven changes in the Hillsdale system. The reduced size of air handling equipment permits us to achieve air conditioning at only a small cost increase over a mechanical ventilation system without air conditioning. Also, air conditioning is highly desirable in Andrews where high temperatures are common in late spring and early fall.

At Hillsdale we tried to achieve a maximum degree of flexibility for changes in room arrangement to meet any educational requirements. At Andrews, although a similar degree of flexibility in interior space design was desired, we reduced partition separations to a minimum. In so doing, we facilitated student circulation and communication between all parts of the school. Andrews High School, of course, cannot be fully evaluated until the project is completed and until teachers and students have an opportunity to work in their new quarters.

Unpartitioned Images

Images of the Future proposes a secondary school program which is carried out by student groups varying in size from about 120 down to ten, with recognition given to the need for individual student spaces for study and research. Such wide divergence of activities, group size and organization prompts speculation about whether or not we can continue to define working and learning spaces with conventional partitions. I, myself, cannot help but believe that schools of the future will be built with less rather than more partitions. If this happens, then acoustics emerges as an important aspect of secondary school design. Our present knowledge of the environment for sound is fragmentary at best. To determine sound levels for the most effective working conditions and to learn more about how individuals react to sound phenomena will require extensive research and investigation. As we progress along these lines, architects and educators will be able to provide students with even better schools than they now know.





Residence facilities for Harding College's new campus will be small building units rather than large-scale dormitories.

On-the-Spot Design of a Graduate School for Religion

by Franklin D. Lawyer
Chief Designer and Associate, Caudill, Rowlett and Scott, Architects-Planners-Engineers, Houston, Texas

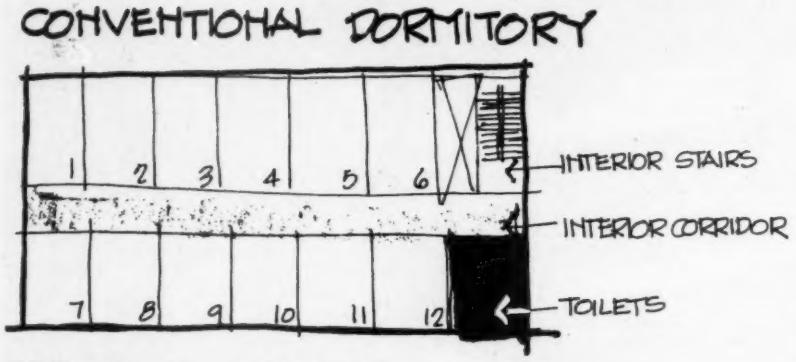
A registered architect in Texas, Mr. Lawyer holds a B.Arch. degree from Oklahoma A & M College and a M.Arch. from Cranbrook Academy. He taught at Texas A & M College from 1951 until 1956, working part time with the Caudill firm. He is now chief designer there.

A "SQUATTERS" IN CRS terminology is the night and day effort of producing basic plans in the near vicinity of a project. This technique, otherwise known as on-the-spot-design, has long been a favorite of ours as a solution to long distance problems and was brought into play again in early summer, 1960, at Memphis, Tenn., where a new campus is planned for a Graduate School of Religion.

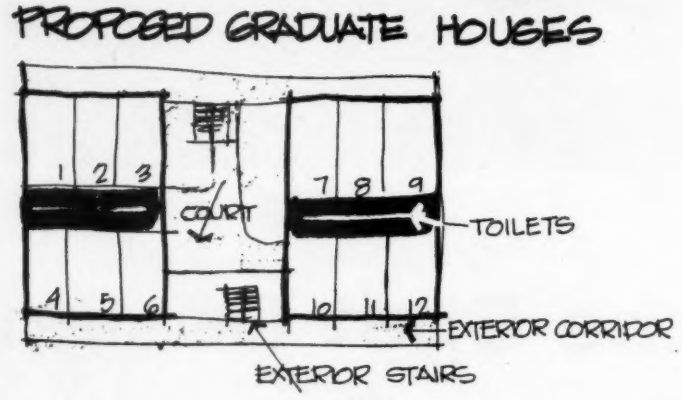
Squatters works this way—a team of architects, city planners and engineers, carefully selected for the specific undertaking, moves into the location where the project will be constructed. These designers set up shop—sometimes in a space near the client's office, sometimes in a hotel, sometimes in the office of a local professional associate—for a three- to ten-day period, depending on the size of the job.

On-the-spot-design is a valuable tool in our work for these reasons:

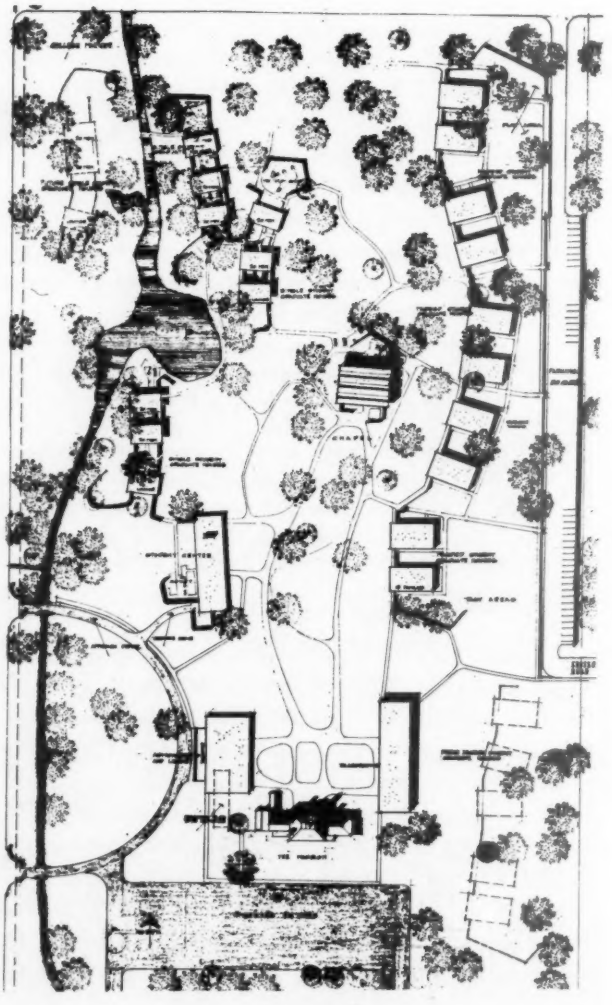
1. We get to know our clients better.
2. We get to know the site and locale better.
3. The highly concentrated night and day endeavor makes us think with a little more clarity.
4. We are spared the interruptions usually found in a busy office.
5. Our client can look over our shoulders and see his project grow from concepts to rough sketches to basic plans.
6. And of even greater importance, our client is an active participant in the design team.
7. In the case of a local professional associate, we can benefit by his participation in the early stages, as well as later.



The conventional dormitory on college and university campuses is designed for mass efficiency. Harding College's proposed graduate houses are designed with the individual student in mind.



Development plan for the new campus. Chapel is located between single student graduate houses and married student living area. Administration-library building, student center and classroom unit complete the complex.



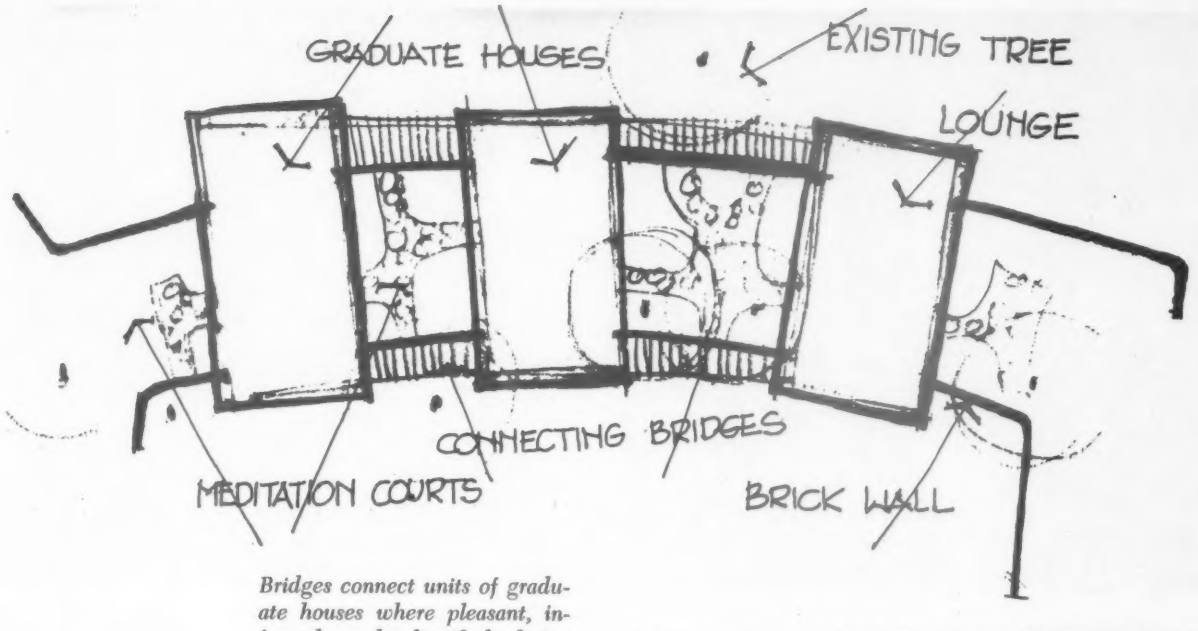
We worked this way at Memphis where members of the CRS design team included Bill Caudill, Herb Paseur, Bill Lacy, our associate architects Henry Sanford and Charles Ellis, and myself. The mission was to develop a master plan for Harding College Graduate School of Bible and Religion and to do the basic design for a boys' dormitory, the first unit to be constructed under the new master plan.

Concepts for Campus Development

On arrival at the Memphis campus of Harding College we met Dr. George Benson, president of the college and eminent leader of the Churches of Christ. Interviews with Dr. Benson and faculty members Dr. W. B. West, Jack P. Lewis and Everett R. Anderson, Reverend J. M. Powell of Memphis and six of the ministerial students enrolled in the graduate school resulted in the following concepts as a basis for the campus development:

1. The Churches of Christ are vigorously alive. They represent growth—physical and spiritual. The churches are served by simple men of strong convictions, men who oppose sham. These men wish to restore rather than to reform. They seek truth at the source and their source is the Bible.

2. If architecture truly reflects aspirations of people, and scholars tell us it does, then what kind of architecture should surround the future leaders of the Churches of Christ? What should the campus

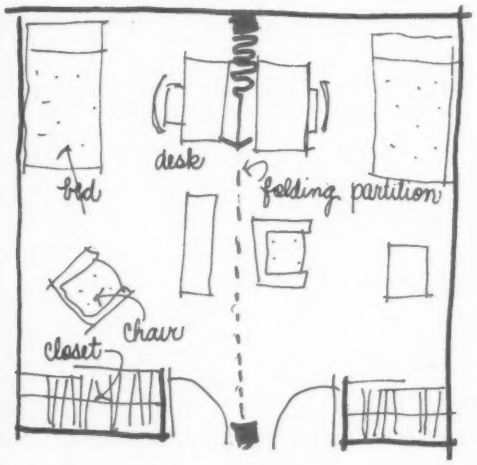


Bridges connect units of graduate houses where pleasant, informal and dignified living quarters are planned for mature students. Meditation courts separate structures.

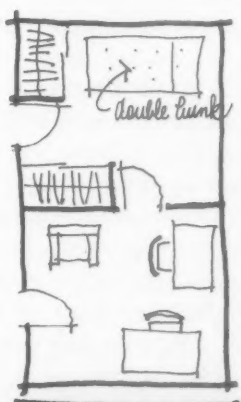
of the graduate school be like? The key is in the name—School of Bible and Religion—which in itself emphasizes the educational accent. An unswerving loyalty to the Bible should then be reflected in the architecture.

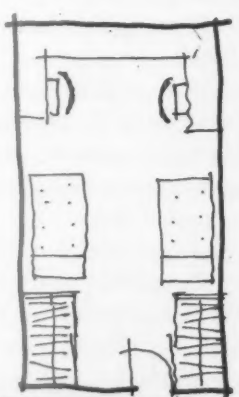
3. The new campus should be symbolic of vigor, strength and sincerity. Twentieth century boxes covered with expensive fourteenth century gothic sauce won't do. Colonial slipcovers or false Georgian drapings which hide the reflections of this day with dead and meaningless ornamentation of yesterday lack propriety. There should be no sham. The kind of architecture we want is neither elaborate nor banal. Like the religion which it represents, it must be simple, honest and meaningful. The new campus should have a spirit—an architectural spirit that helps young people discover beauty as well as truth, that lifts them to greater achievement.

4. "America's one hope is a revival of Christian



Combination sleep - study area can be divided into two separate rooms with a folding partition.



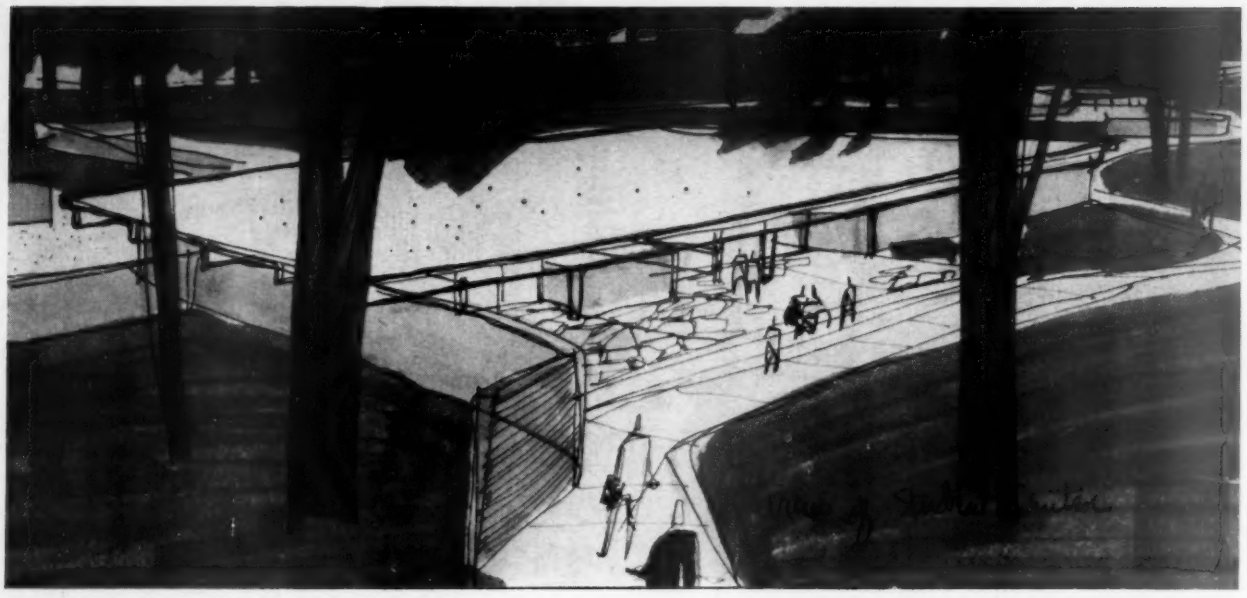


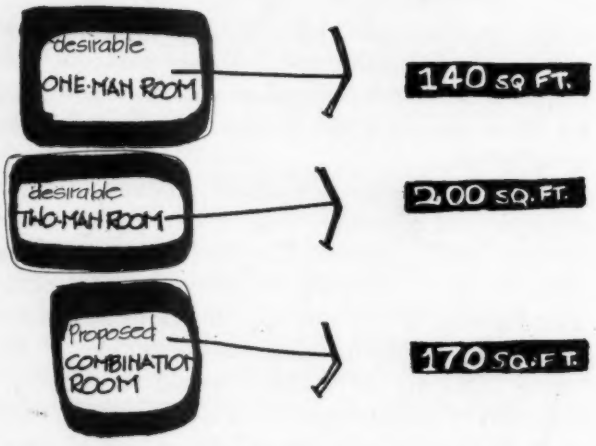
ADJOINING Study-Sleep areas

SEPARATE Study-Sleep area

COMMON Study-Sleep area

A variety of environments is planned, each conducive to study and meditation.





Minimum 2-man room later converts to spacious 1-man room.

zeal." With this statement Dr. Benson explains how Harding College is dedicated to the survival of America through realization of the gospel. It should be the intent of the architecture which facilitates this program to inspire and stimulate dedicated young scholars to find their way into effective Christian service.

5. Dr. Benson has stated, "We don't cater to any particular style as such, but we do want buildings that have strength and dignity." Like so many of us, he respects buildings that have a feeling of permanency. Brick, one of the oldest of materials, helps give this feeling. Concrete is another traditional material and dates as far back as the Romans. We believe that by using the same kind of brick as that of the existing buildings, together with exposing the white concrete structure, we can achieve a pleasing architectural harmony without the limitations of uniformity. The aim is to develop a plain, straightforward architecture that will have a massive and permanent feeling with the dignity of its intent.

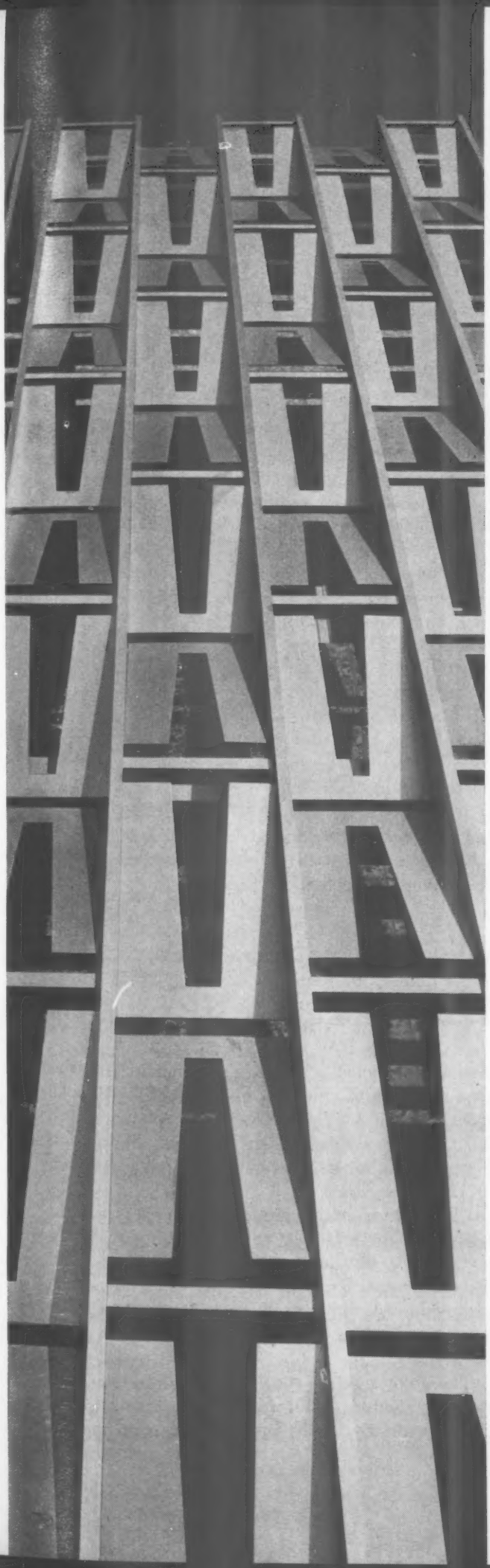
6. Trees, grass, shrubs and beautiful buildings! These are the elements of a stimulating environment for learning. And here on the campus with very little expense we can have another element, water, to enrich the natural setting. We need only scoop out a few yards of earth, move it to the lower end of the ravine, and build a small dam to have a beautiful campus pond.

7. The new campus should be unique. Its purpose is not to train great engineers. Let M.I.T. do that job. Its purpose is not to train business executives as is done in the Harvard Business School by the Charles River. But at 1000 Cherry Road in Memphis, Tenn., the job at hand is clear. It is to train great preachers of the gospel, missionaries, directors of religious education, and other servants.

Adapting Form to Function

"If there be any principle of structure more plainly inculcated in the works of the Creator than all others, it is the principle of unflinching adaptation of forms to functions." It is interesting to note that these words by Horatio Greenough were stated about the same time the Restoration Movement of the Churches of Christ took place over a century ago. Today these same words serve as the principle for designing the new campus of the Graduate School of Bible and Religion.

The design team felt that the form of this campus must grow out of the concepts as stated and that there must be "unflinching adaptation of forms to functions."



Solar Screened College Library

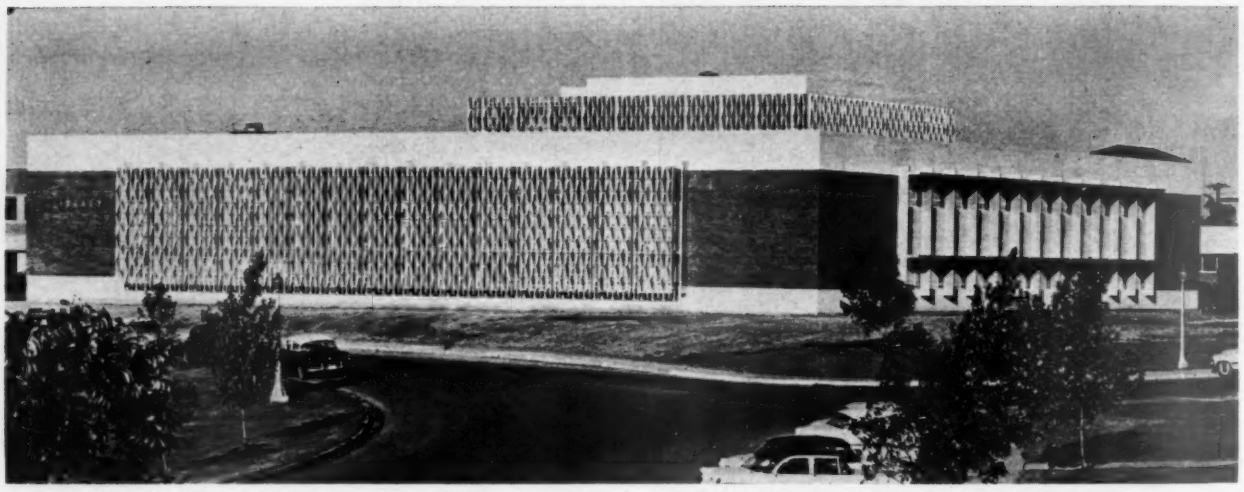
by John Emmett Burke
Director of Library Services, East Texas State College, Commerce, Texas

Dr. Burke is a graduate of the University of Chicago and earned his doctorate at the University of Denver. He assumed his present position at East Texas State College in 1953. Prior to this Dr. Burke was a school and college librarian. He also serves as a consultant to college, school and public libraries.

A LIBRARY IS VITAL in establishing a college as a place of intellectual contribution. It is indispensable to the instructor in the classroom. It is the basic workshop for the student at any stage in his career. It is the heart of the college, the storehouse of what is already known, the source from which new knowledge springs.

So central to the purposes of a college is the library that one executive of an educational foundation, who has supervised the giving of millions of dollars for education, states that if he wants to size up a college in a few minutes he can do so by visiting the library. As the symbol of a college, the library is crucial.

A library can be enjoyed by all elements in a college and at the same time become a center of cultural activity. It serves these purposes in part by providing a good collection of materials and a friendly place for study and reading. And it serves students and faculty members even better with an active promotional program. Such a program is designed (1) to attract people to the library; (2) to



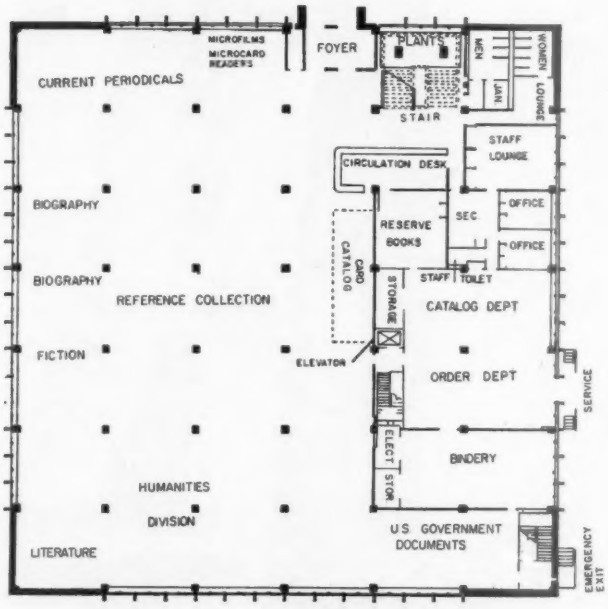
Solar screen and louvers add beauty and help ward off sun heat from the air-conditioned interior. First floor plan is shown below. George L. Dahl, Inc., are the architects.

publicize the various offerings of the library; and (3) to foster and stimulate cultural activity on the campus.

The new Library at East Texas State College, Commerce, Texas, is a modern, functional building designed to meet the varied needs of the college today, and flexible enough to serve those of the future. The apparent simplicity of the completed building is the result of much study. It is a large, slightly rectangular, two-story structure topped by a penthouse. It contains approximately 60,000 square feet of floor space; has a capacity of 200,000 volumes; is constructed almost wholly of fireproof materials—concrete, brick, steel and tile; and is based on a modern, economical, flexible and convenient modular style, allowing for horizontal expansion. Joists and beams are strongly reinforced with steel, much steel mesh is used and electrically welded. Beams rest on columns which contain, in each, eighteen pieces of steel. Thus the building should serve for fifty or more years. The four sides are very much alike, and are almost equal in size, the width being 164 feet, the length, 168 feet.

The college instructor, the student, the research worker all find the library built for service and convenience. A ceiling of light on both floors and uniform fluorescent lighting in the work areas, plus complete air conditioning, permit the use of every inch of space. Air conditioning, besides being comfortable, helps considerably in the preservation of books and documents, which deteriorate rapidly when exposed to repeated humidity and temperature changes.

The entire arrangement of the new library fosters economy in staffing and ease of operation. Tables and chairs are available close to all shelving areas; an elevator has been installed for the transportation of students, library staff, and books from the first to the second floor. A passageway leads to the administration building, making the library easily accessible to students and faculty in all kinds of weather.



All furniture and equipment were provided in keeping with the objective of making the library a warm, friendly, and inviting place. Lounge chairs are upholstered for looks and comfort. Study chairs are modernistic in appearance yet comfortable for use at the tables. Students feel at home in their library.

The color scheme, the lights and windows, the relaxing comfort of furniture and equipment, and the accessibility of the books, magazines, pamph-

lets, clippings, files and other library materials—all have been used to advantage to make the environment one for quiet study and inspirational research.

Among the features of the new library are informal areas for students and faculty; an automatic elevator; a ceiling of light giving true daylight reading illumination to all areas and at all times without glare; conveniently located reading and study tables (including carrels) close to the bookstacks; comfortable home-type lounge chairs; multicolor free standing steel stacks; an outside book return chute at the main entrance for the return of books even when the library is closed; and many other features, including an electric automatic charging machine to facilitate the checking out and return of books. A soundproof room is provided for the individual use of documentary films, music and typing. Microfilm readers and a microcard reader enable reference to the back files of newspapers and special books not otherwise available in print.

Also among the well-received aspects of the library are the eye-rest green chalkboards, the glass and aluminum display cases, cork bulletin boards and the convenience of the coat room.

Although quite large, the reading areas are designed to create an atmosphere of friendliness. Seating arrangements are informally inviting, varied and comfortable, with free standing bookcases affording ease of use, and creating a sense of privacy, quiet and freedom from distraction. The library, with its air conditioning and color combinations, is scientifically planned for maximum studying efficiency.

The architects, George L. Dahl, Inc., of Dallas, and the library planning committee did not set out to draw up a "pretty" library but, rather, a useful one. It was not their intention to develop a showplace for campus visitors. The plans, equipment and furnishings have all been carried out with only one idea in mind, namely, to create a library which will best serve the students, faculty members and administration. Because of this singleness of purpose, East Texas State College has a library which is acclaimed as truly beautiful and utilitarian as well.

In August, 1960, the Texas Society of Architects announced that an out-of-state jury had voted the library at East Texas State College to be one of the best buildings constructed in the state of Texas in the 1950's. The planning for this award-winning library reached back into the years and was the outcome of vision, need and detailed hard work. In 1947, when he was appointed president of the college, Dr. James G. Gee pointed out that the quality of faculty he envisioned could not do effective teaching and research without a first-class library. With the possibility of building funds at last being allocated in 1958 for a new library, Dr. Gee appointed a faculty-wide committee, consisting of every department on the faculty, the administration and the library staff, to plan the new library. George L. Dahl, Inc., architects and engineers of Dallas, were appointed architects.

Among the first steps in planning the new structure was to "program the library." The five basic service elements of the new library were analyzed: the technical processing center; reading areas for students and faculty members; service centers for circulation, reference, government documents, and periodicals; administrative services; and the offices, classrooms and laboratories for the Department of Library Science. The architects received an outline of these basic functional services and the number of people and the amount of materials involved.

Early studies then proceeded to schematic diagrams of stacks, furniture layouts, floor plans and elevations. Templets helped visualize these arrangements. A site was selected as close to the population center of the campus as possible, and in accordance with the master plan of East Texas State College, as formulated by President Gee.

Flexibility of Areas

One of the main criteria for the library was flexibility. Shelving areas may be converted into reading or office space, and vice versa. Lounge or informal reading areas can be utilized for shelving and study space should the need arise. If and when the educational pattern of East Texas State College should require revision, the new college library, it is hoped, would be adaptable with a minimum of alteration. By keeping partitions at a minimum, the planning committee felt that supervision could be maintained with the fewest possible attendants —an important factor in economical college library administration.

The flow of traffic was studied as well as the flow of material (books, magazines and supplies). It was agreed that all traffic should enter and exit at the main entrance of the library. An important problem before the planning committee was that of communication within the 60,000 square feet of library area. The idea of an intercom or public address system was discarded. It was felt that the cost of these services could be spared and the moneys thus saved spent on more essential library features. Final decision established telephones, serviced by the college switchboard, for communication within the library. Three inside stairways also augment library communication.

Every phase of planning was subject to review

and revision by the committee. It accepted the full extent of responsibility. As plans approached the stages of final approval, the question of equipment and furniture came under consideration. These items were to be secured directly by the college purchasing agent and not as part of the general construction contract. The architectural firm of George L. Dahl gave generously of the time, skills and capabilities of its personnel to recommend furniture and equipment which would be in keeping with the general motif of the library.

The final drafting of plans, as submitted by the architect, was approved by the library building committee, by the administration of the college and then by the Board of Regents of the State Teachers Colleges of Texas. Bids were requested. Carpenter Brothers of Dallas was the low bidder and the contract was awarded to them on July 1, 1958. The low bid called for an outlay of $761,475, excluding equipment. Subsequent bids for equipment amounted to $86,988 and, since all furniture in the old library was utilized in the new building, a low bid of $10,000 was accepted to refinish the old furniture. The general contract included an amount of $17,500 for a charging desk and bookcases around the walls. The cost of the new library, excluding equipment, was $13.55 per square foot.

The grid plan used in planning the library is the putting together of a series of repeating open squares. This modular system is as old as the Chicago skyscrapers of the 1880's. Such design produces economical construction and means fewer interior partitions and walls to defy flexibility of arrangement. The plan of the library is a simple one. For reasons of location, economy and planning efficiency, the library is a giant rectangle. Inside the four outer walls are smaller rectangles formed by the supporting columns. Each module of the plan measures 24 feet by 27 feet, and there are 84 modules in all.

Exterior Features

The exterior of the library is composed of red pressed brick and precast terrazzo. Long, wide windows permit the entry of daylight and add brightness to the interior. The west side of the library is protected from sun heat and glare by a decorative aluminum solar screen of fanciful design. Aluminum baffles are located on the other three sides. These upright baffles, 20 feet high, 2 feet wide and 4½ inches thick, extend from the bottom of the first floor windows to the top of the windows on the second floor.

The exterior finish matches existing buildings on the campus. Simple and straightforward, the library depends for its beauty on pleasing lines and contrasting textures. Floors were designed to carry the maximum load. The steel stacks in varying colors are free standing and can be rearranged. The space between the top of the stacks and the plastic ceiling of light is 14 inches for free circulation of air.

Ceiling heights are 8 feet, 8 inches in the clear. Glass entrance doors are flanked by large panes of clear glass. Foundation walls and spread footings are of reinforced concrete; the superstructure, steel frame; the floors are concrete slab on bar joists.

Library interior features open stacks for all books and magazines. Tables and chairs are included in bays which contain reference books.

One of three lounges provided for casual reading and study. Smoking is permitted. Ceiling of light gives average maintained illumination in excess of 55 foot-candles.

Stone facings of the exterior walls are backed with 8-inch hollow tile and interior finish. The flatroof is a 20-year four-ply coal tar pitch laid over insulating concrete fill on structural concrete deck.

Ample parking facilities have been provided near the main entrance of the library according to the master plan drawn up for the college. A book return chute, located near the main entrance, is similar to bank night depositories.

Earning more student applause than any other innovation is the lounge, a colorful room which offers a welcome diversion from studying in the form of a coffee club atmosphere. It is a place where students can take a few minutes off from their books and relax. The room includes a kitchen, fully equipped with silverware, china, pots and pans—all belonging to the students.

Heating and Air Conditioning

The heating and air conditioning system is located on the third floor. Two storage rooms are also included in this area. Reached by either public elevator or by stairway, the area is surrounded by an exterior solar screen which is both functional and decorative. The units used in the machinery of heating and air conditioning were manufactured by Trane.

Year round comfort is maintained in the library. Two air handling units, one for each floor, are located in the penthouse mechanical room and provide either cool or warm air as required to maintain comfort. The system is conventional low velocity with air supplied through ceiling diffusers.

During spring and fall months, heating is required in some areas, while cooling is required in others. This is accomplished by pumping hot water through the heating coil and cold water through the cooling coil simultaneously. Ducts run to each area from these units and the area thermostat operates a damper motor which causes air to pass through either the hot or cold coil to maintain the thermostat setting. No heating or cooling is required in summer and winter respectively.

Water is heated by being pumped through a hot water boiler, similar in action to a water heater. Cooling water is cooled by being pumped through the electric centrifugal refrigeration unit, similar to a drinking fountain in principle.

The heat which is removed from the air in passing over the cooling coil is removed by the refrigeration unit and dissipated through the cooling tower, using the evaporative cooling principle. This tower is also located on the third floor. Entry heating is supplemented by an additional heating coil.

The plumbing system is comprised generally of gravity soil, waste and storm water piping with no basement areas to be pumped. A recirculating hot water system originates with the hot water main on the third floor and serves all required fixtures. Drinking water is supplied by means of several Halsey-Taylor package coolers.

The present book and periodical collection of the East Texas State College Library totals 141,461 volumes. A continual process of weeding takes place. With an average yearly increase of about 5,500 volumes, growth for several decades can easily be taken care of. It should be pointed out

that all space within the building is devoted to library purposes. Three classrooms are set aside for the use of the Department of Library Science, since East Texas State College is outstanding in preparing school librarians for Texas, Arkansas, Oklahoma, and Louisiana. These classrooms are located on the second floor of the library and are accessible from the library proper and may be used by all departments of the college for lectures, movies, or other cultural purposes.

Steel Shelving Used

The new library provides steel shelving for more than 200,000 volumes. There is ample space for additional steel shelving for 200,000 more volumes should they be needed. At the present time the library will seat 865 students. There is space for 700 to 800 more chairs in the building without crowding. Bookstacks are on both the first and second floors. Material on the humanities, literature, biography, fiction, and the current periodicals are housed on the first floor. On the second floor are the books on the social sciences (including education), physical sciences, useful arts, history, geography, children's literature, and library science in addition to the bound volumes of periodicals.

Wall space under the windows on three sides contains adjustable shelving of ¾-inch white oak veneered plywood. This shelving is supported on recessed track and brackets. There are 72 sections of shelving on the first floor and 85 sections on the second floor. This feature adds both color and softness to the beauty of the interior and also increases the book capacity of the building.

When the library planning committee figured book capacity for the new library, the average considered was 25 books to a 3-foot shelf. Standard shelving is seven shelves high. It was assumed that each single-faced section would hold 175 volumes and each double-faced section, 350 volumes. These calculations were for maximum capacity, but since shelves would not be filled completely, 25 percent was deducted to arrive at a working capacity.

The committee also figured that, in a bookstack installation, about 85 percent of the shelves should be eight inches in depth, and 15 percent should be ten or twelve inches in depth. It was impossible, however, to predict where the deeper shelves would be required to conform to the arrangement of the class numbers. The locations of these shelves, it was felt, would change from time to time as the library grew. With bracket stacks, these ten-inch and twelve-inch shelves can be interchanged with eight-inch shelves at any time anywhere in the stacks, without disturbing the structural uprights.

Double face steel shelving, furnished by Estey Corporation, lines each modular bay, with passage room at either the middle of the shelving or at the ends. Books are placed on the open shelves, arranged by Dewey Decimal classification, and are accessible to the students. New library furniture from John E. Sjostrom Company, consisting of tables and chairs, occupies the center of each bay so that students and faculty members can be close to the books and periodicals being consulted for study or research.

Bound periodicals at the present time are arranged in a band of twelve ranges of steel bookshelves or more than four bays. Unbound periodicals, housed to the right as the patron enters the library, are arranged in two bays.

The whole library may be regarded as a reading room. An unobstructed view of the first floor is possible from the charging desk at the main entrance. The same may be said of the area at the top of the principal stairway, located to the left of the entrance. Comfortable lounge chairs and divans make the area at the head of the stairs a lounge for smoking, browsing, study and reading, and an extremely popular feature of the new library. Arrangements of round tables alternating with rectangular ones, and multi-colored leather back chairs, lend an air of informality to the whole area.

The East Texas State College Library features steel bookstacks by Estey Corporation. The stacks are free standing and permit placement in any position in the library without relation to the walls. The modular bays are surrounded by double-faced steel bookstacks. A total of 110 ranges of stacks, varying in size from nine inches to twenty-one inches, were installed in the building. Ranges consist of three to seven sections each. With no additional cost for color, the stacks were supplied in the following colors: tan, turquoise, green metallic, gray and orchid. Tan predominates. Birch wood end panels were specified for the steel stacks in areas most prominent to the public. Uninterrupted height of the panels reveals the beauty of the wood and helps to preserve the warmth and friendliness which characterize the library. Both horizontal and sloping shelves are used for the periodicals. For back issues of the magazines, an open type horizontal shelving is particularly effective.

Furniture and equipment were selected for comfort for relaxed study and research. It was felt by the library planning committee and the architects that furniture should be of wood because it is a warm, beautiful and home-like substance.

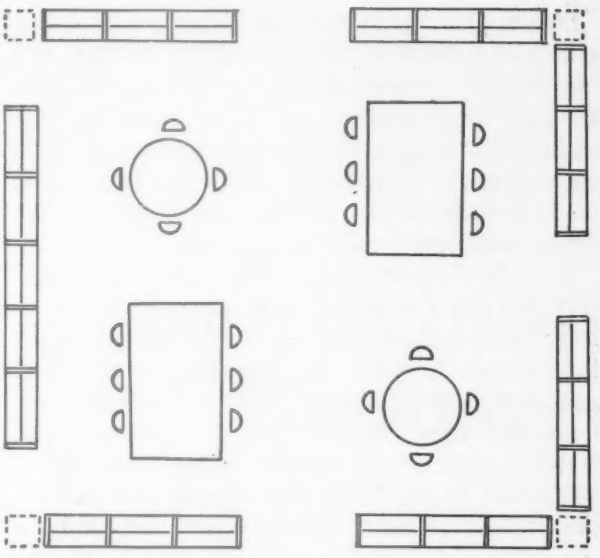
Chairs are molded to fit the human form. A mini-

mum of structural parts comes into contact with the body. Generous curves eliminate the danger of catching and snagging clothing. The library chairs, with their pleasing abstract shapes, are appropriate in a variety of settings. Floating seats and suspended backs give them an openness and lightness of feeling. Some chairs are upholstered in flame, black, yellow, gunmetal and turquoise leather, while others have plain wooden backs.

The wall treatment of white oak panels matches the maple and oak of the furniture, including the card catalog. The main card catalog had been in use in the old library for thirty years and was refinished prior to installation in the new library. Occasional furniture, placed in various sections of the library, adds contrast as well as home-like comfort. Naugahyde is used on all lounge furniture, including that of the browsing area. Formica is used for the counter tops in the library science classroom and in the students' lounge. These counter tops are 25½ inches overall from front to back and have a backsplash four inches above the desk surface.

The heavy graduate program at East Texas State College, leading to master's degrees in the arts, science, education, library science, music, and business administration, indicated the need for study carrels. When the library planning committee investigated carrel facilities in recently constructed college and university libraries, it was learned that 75 percent of the closed or locked carrels were vacant more than half the time.

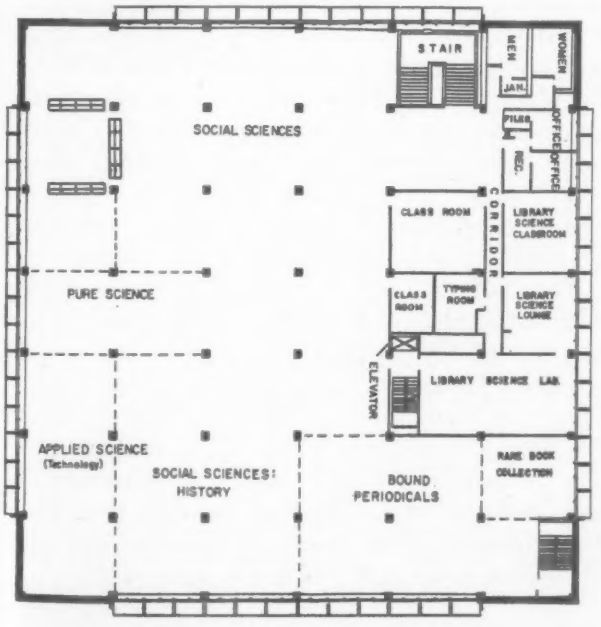
Profiting from such experience, 76 individual study tables have been supplied which may be moved close to the bookstacks for concentrated research. Some of these free standing study carrels have shelves for books and some have not. The carrels are 29 inches high with dimensions of 24 inches by 35¼ inches. Book racks are seven inches deep and twenty-two inches high overall, providing 10¼ inches of clear space under the first shelf.



Typical library bay has rectangular and round tables for student study.

Old furniture from the former library included 52 oak tables, seating eight persons each. New Life library furniture, supplied by John E. Sjostrom Co., makes up the bulk of the new furniture purchases. Twenty-six round tables, each 50 inches in diameter, are located throughout the library. Sixteen rectangular tables were also purchased.

Library's second floor houses the science collections and rare books.



Element of Lighting

Lighting was a major element in designing the library and dictated exhaustive pre-design studies to determine exact activities and lighting requirements. The ceilings of light on both the first and second floors are high quality installations which permit maximum flexibility of furniture and bookstack arrangements with lighting intensities above recommended norms, coupled with low brightness throughout.

Fifteen hundred 40-watt fluorescent tubes on each of the two floors, concealed by a covering of plastic, give 50 to 55 foot-candles of average maintained light. It is thus possible to read titles on the spines of books in the most remote corners of the library whether it is sunny or cloudy outside. In other words, sufficient overhead illumination maintains light without glare at table top surface or at the lowest shelf of books.

Lighting fixtures fit 18 inches above the luminous ceiling of solid light. Enhancing the ceilings are thin, brightly colored suspended baffles. The baffles help to counteract any visual boredom that might result from tedious and long hours of reading and study. In addition, the baffles help break the brightness of the ceiling, add beauty to the library, and absorb disturbing noises.

At night the luminous ceiling serves as an outstanding and attractive sight, identifying the library from afar. According to library personnel, the ceilings of light have provided good visual comfort and minimize eye strain and fatigue. Students now spend four to five hours reading and studying in the library without experiencing physical fatigue or eye strain. The plastic of the luminous ceiling seems weightless, is easily removed and replaced for any necessary repairs or for the insertion of new fluorescent tubes.

In the offices of the library, in the technical processing department, and in the Department of Library Science, continuous rows of cool white fluorescent tubes, mounted above a louvered grid, produce more than 50 foot-candles of average maintained light. Colored fluorescent tubes (red and green) have been placed in certain areas, such as the lounges.

Switch boxes for light control are in four strategic locations. The library staff initially had requested one master lighting switch. This plan, however, was abandoned when it was learned that it would cost more than two thousand dollars. On the first floor are two switch boxes concealed behind the oak paneling. The other two are at opposite ends of the second floor reading room. All four boxes are controlled by a master key.

With four master switch boxes, current failure cannot plunge the whole building into darkness. Usually, just one-fourth of the lights go out, the other three lines remain working.

Another feature of the lighting system is the "avenue of light," controlled by the usual type electric switch. A certain number of lights, not directed by the master switch boxes, can be turned on when needed.

Flooring is of light colored vinyl tile, 9 inches square and 3/32 of an inch thick. Specifications required a tile that would have a high resistance to cigarette burns and would be capable of withstanding a furniture load of 200 pounds per square inch without leaving a visible permanent mark. The color of the tile installed blends with the furniture and walls.

Windows and doors have aluminum frames with glass and hollow aluminum doors used at the entrances. Rectangular, three section windows are covered with a stainless aluminum screen for beauty and for protection against the sun. Further ornament is given the windows exposed most to the sun. Window sills are of oak. Metallic venetian blinds shade windows on the interior. The window area was planned so it does not interfere with wall space needed for books. No breaks occur in the walls except for the main entrance, the service entrance and the fire exit. Oak bookcases with an adjustable shelf are located under each window.

One of the striking visual effects of the library is the way color is blended and contrasted to produce a pleasant and happy environment. A blueprint of color determined hues of the walls, of the plastic covering on the bay columns and also of the leather and Naugahyde upholstery. No room of the library has less than two colors. These have been skillfully blended or contrasted to produce a striking effect. In all, seven colors were used in the custom-made du Pont paints.

Open Bookstacks

The greatest single difference between the old library and the new from the standpoint of service lies in the policy of the "open bookstacks" as opposed to the closed. Almost all of the resources of the East Texas State College Library of more than 141,000 books, pamphlets, magazines and other library materials are available to students and faculty members, and ample space is provided for the different types of study and research that patrons may wish to do. Study tables, carrels, chairs, study enclosures and informal reading areas are interspersed in the stack areas on both floors.

It is not possible to prophesy whether open stacks will always be the best method of operation for the library at East Texas State College. Should circumstances ever necessitate the return to a closed stack policy, facilities have been provided which would make this switchover possible in a smooth and efficient manner. The new library, therefore, is adaptable to either open or closed stacks.

The students, faculty members, library staff and administrators have been exceedingly pleased with the new library building, now that it has been in operation for almost a year. It is particularly gratifying that many of the students have really made the library their study center both day and night. The 76 carrels or study tables have been heavily used and their movability from one area to another has demonstrated the wisdom of providing this type of flexible study center over the fixed carrel.

Man Behind Design— The Specification Writer

by Harold J. Rosen

P. E., Construction Specifications Consultant, Merrick, New York, and Chief Specification Writer, Kelly & Gruzen, Architects-Engineers, New York City

Mr. Rosen has a B.Ch.E degree from City College, New York. He is a member of the Construction Specifications Institute and a contributing editor to Progressive Architecture, *writing a monthly column entitled "Specifications Clinic." Mr. Rosen is also an associate with the architectural firm of Kelly & Gruzen, New York.*

SPECIFICATIONS consist of a detailed description of the materials, processes, methods and workmanship required to erect a structure. Specifications compose one of the contract documents used in constructing a building, in addition to the agreement and the drawings. Since they are essentially instructions to the contractor, they must be reasonable, simple, clear and complete.

Specification writing is unlike any writing which requires new and original material and presentation. Eighty to 90 percent of the language and format is copied from old specifications, manufacturers' literature and certain standards developed previously. Plagiarism is encouraged and specification writers are willing and eager to pass on information to others through standard paragraphs and clauses prepared for recopying time and again. The remaining 10 to 20 percent of specifications for new structures must be written explicitly for the building in question.

Some materials and some workmanship will be the same whether the building is a school, hospital, university structure or a church. Language employed to describe the work can and may be identical, whatever the building type.

For example, the trade section on "excavation" does not depend on the building type but relates rather to site conditions. A competent specification

Plagiarism is encouraged.

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writer has standardized clauses filed away which he uses to describe site problems like clearing and grubbing, stripping topsoil, sheet piling, rock excavation and payment for same, dewatering, underpinning of adjacent buildings, protection of existing trees, footing drain tiles, etc. Nor is the trade section for "concrete" normally based on building type. It is concerned with the foundation and structural system and whether or not concrete will be employed as architectural treatment for exposed exterior walls and panels. Here again the specification writer makes use of standardized clauses and previous or guide specifications. He has compiled all of these and uses them as a basis for specifying and describing the building under consideration.

There is a compelling need to assemble and use old material. It takes much too long to write an original specification. Also, it is advantageous to use standardized clauses proved satisfactory in the past, and which can be readily adapted and woven into the new specification. This old material, edited to suit particular conditions, comprises 80 to 90 percent of the new specification. The specification writer thus has the time to research and investigate new materials and equipment for the project at hand.

It is precisely in this "new" area that the experience and talents of a specification writer are exploited to the utmost. If he has done his homework, the bulk of the specifications for a new educational building is obtainable from the sources mentioned. Now he can spend more time investigating and analyzing special materials and equipment pertinent to the building in question.

The Science of Construction

Several factors are at work today in the developing science of building technology and construction. Contemporary architectural designs and forms, for example, have fostered a new industry —metal and glass curtain wall manufacturing. This has caused the development of new metal alloys, finishes, sealants and a terminology all its own. Manufacturers are constantly striving to produce new and better building materials. Owners and users are seeking new solutions to their building requirements. Changes in educational methodology and concepts are reflected in the criteria and planning of new educational buildings.

All of these factors make demands on the specification writer. He must prepare and save a set of standardized paragraphs and clauses to edit and reuse, so that he has more time for those special requirements that are part of every project. When a new educational building is being designed, all the foregoing elements are taken into consideration and analyzed. Even before specifications are begun the writer, who is an expert in materials, will be consulted concerning materials and equipment under consideration.

What exterior materials and windows are suitable for the façade of the structure? Is there a window manufactured that is economical in initial cost, ventilates properly, requires little maintenance, and will last the life of the structure? Will a metal curtain wall be used? If so, considerable research insures that the curtain wall system chosen will prove adequate to needs. As previously noted, the development of the metal curtain wall required painstaking efforts by architects, specification writers, engineers and building material manufacturers to produce a wall system that overcame leakage, fastening problems, corrosion, etc. The specification writer was instrumental in bringing these problems to the fore and in cooperating with manufacturers to overcome them.

Which new materials and equipment can be designed into an educational building? Literally dozens of new products are produced by manu-

There is a compelling need to assemble and use old material.

facturers today. If any are to be considered, they require investigation. If materials are to be used for the first time, the specification writer will work closely with the manufacturer to make certain the product is carefully described and will perform the work intended.

Where new answers to building requirements are sought by owners and users, the designers transform ideas into working solutions and the feasibility of putting the components together is discussed with the specification writer. Here again, he is employed to his fullest, seeking out and developing any special requirements brought about by departures from the norm. It is because the bulk of the specifications can be garnered from existing standards that the specification writer has time to devote to the unusual demands of innovation.

Developing the Specifications

To illustrate, let us take a typical new educational building and indicate how specifications are developed. If exposed concrete panels or prestressed concrete framing are used, they usually require investigation because these items are not used every day and most writers will not be familiar with them. Concrete panels can now be precast in large sections. Some of the fabrication methods were developed in Europe and only recently introduced in this country. The specification writer calls in local representatives engaged in producing the material and visits the plant to see the material made. He learns what compressive strengths can be achieved, maximum handling sizes, the type of fasteners to be incorporated, the finishes to be imparted, costs, erection problems. and whether or not others manufacture the product competitively. He then develops the specification and asks several manufacturers to review it to see if it is practical and if, with certain modifications, they can all bid on it.

Prestressed Concrete

When prestressed concrete framing members are to be used, the specification writer has to acquire another fund of information. He learns about high tensile steel reinforcement, pretensioning and post-tensioning methods, curing, camber, erection problems and costs. With this information he can write the required specifications so that the prestressed concrete can be employed successfully in the new educational building.

If cast-in-place exposed concrete is to be used, the specification writer seeks information from the

Specification writer visits a plant to see materials made.

Portland Cement Association and from manufacturers of concrete additives and admixtures. He obtains data on concrete forms, positioning of metal reinforcement, the use of air entraining agents to prevent scaling and pitting of concrete, the size of fine and coarse aggregate, the maximum height of placing concrete, and proper curing and finishing methods. Since the concrete will be exposed without any covering veneers, the cement and aggregates must come from the same source throughout construction to avoid variations in the finished concrete. All of this information is incorporated in the specifications to give the contractor proper guidance in performance of his contract.

Flooring Materials

There are countless types of flooring materials on today's market. The selection of flooring for particular spaces within a new educational building is determined by many factors. Whether a laboratory, corridor, library, gymnasium, locker room, food serving area, toilet or classroom, each space presents its own problems. The specification writer is generally familiar with all current materials. However, manufacturers introduce new products daily and the specification writer who is on top of his job will seek out and become familiar with the latest developments in this field. He should appraise and evaluate these materials so he can make recommendations when called upon. The selection of a flooring material is based upon ser-

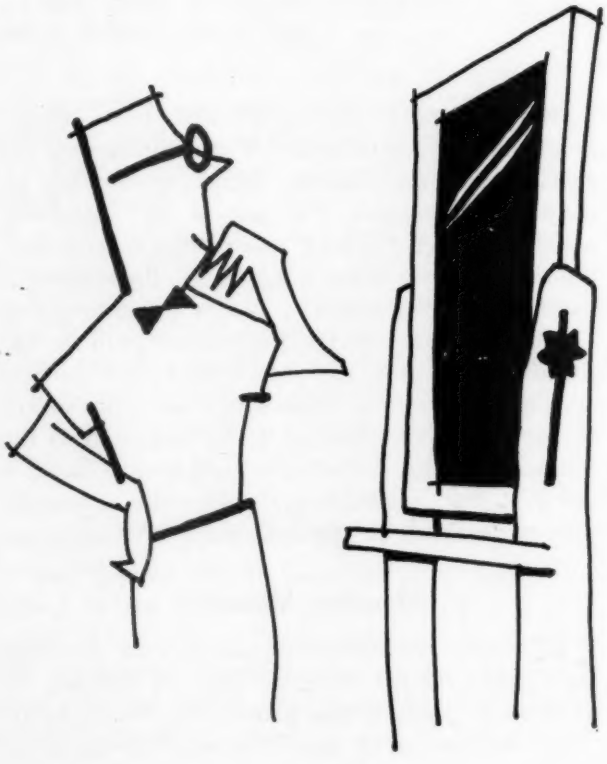
viceability in a given space, maintenance and economics.

Paint, Chalkboard, Insulation

In the field of paint materials, manufacturers have taken giant steps since the days of linseed oil paints. There are alkyd resin paints and latex paints as well as the old familiar types. The latex paints are water emulsion paints and include butadienestyrene, polyvinyl acetate, acrylic and urethane. The specification writer should be well versed in all new paint developments so he can select and specify the types best suited throughout the new educational building.

Chalkboards and tackboards, too, have changed since the days of the little red schoolhouse. Slate blackboards have been joined by porcelain enamel steel, vitreous enamelled glass, composition boards and asbestos-cement chalkboards. And now, besides corkboards, there are vinyl fabric covered composition boards. The specification writer must be conversant with all these so he can pass on their pros and cons to the client. Based upon the client's requirements, the specification writer should be able to select chalkboards and tackboards which conform to needs and fulfill the project demands.

Specification writer selects chalkboard conforming to needs.



The multitude of insulating materials is legion. These can be made of glass fiber, foamed glass, expanded polystyrene, cork, paperboards, vegetable fiber, mineral wool, cementitious perlite and, while this is being written, a dozen others are being introduced. Insulation comes in rigid form, batts, loose fill, pourable for cavity walls and extruded for pipe covering. The kind and type of insulation to use—for walls, roofs, refrigeration spaces and perimeters—must be determined by a specification writer who is familiar with them and who can select accordingly.

Use and Reuse

So we see that, unlike design drawings, the material which comprises specifications can be used again and again and for dissimilar types of buildings. Excavation, concrete, masonry, roofing, insulation, glazing, painting, plastering and other trades can be and are used across the board for specifying most types of building construction. If no known material is available to perform a certain task, a manufacturer will be brought in, the problem placed before him and, together with the specification writer, a product developed to meet requirements.

Specification writers are constantly at work investigating, appraising, selecting. Their industry and know-how are behind building design; they form the bridge between the architect's drawing board and the contractor's blueprints for construction.

How to Use this Building Reference Material:

Editorial material and products which relate directly to educational buildings, themselves, and to grounds and transportation are classified in four major areas:

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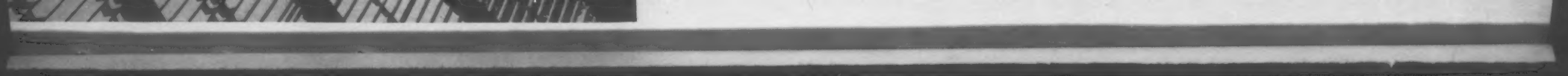


Lightness and economy can be achieved with laminated wood, as employed in the Union College Fieldhouse by architects McKim, Mead and White.

Technology's Impact on Construction

by Fred N. Severud
Severud-Elstad-Krueger-Associates, Consulting Engineers, New York City

Senior partner of Severud-Elstad-Krueger, Mr. Severud has been consultant engineer for such buildings as hospitals, research laboratories and centers, airports, housing developments, theatres and industrial buildings. He is a graduate of the Norwegian Institute of Technology, Trondheim, Norway.

and Walter F. Conlin, Jr.
Severud-Elstad-Krueger-Associates

Mr. Conlin is a graduate of Worcester Polytechnic Institute, Worcester, Mass., and has been associated with Mr. Severud since 1948. He has had extensive experience in structural design and has directed and supervised many of the firm's school projects.

ALL KINDS OF facts and information must be digested by the educators and school board members who will provide their communities with an unprecedented number of schools and colleges in the immediate future. Not the least help to them in discharging this responsibility is a knowledge and appreciation of recent technological advances and trends in building construction.

Prewar structural techniques and the application of building materials were somewhat stereotyped and could, in general, be easily evaluated and understood. During the last two decades, however, the improvements and innovations of construction have been varied and complex. One of our most eminent architects, Edward Durell Stone, has said that "the radical changes" are only beginning. How, then, can a telescopic discussion on such a complicated subject assist our educational authorities? Should not the intricacies of modern construction be left solely in the hands of the experts—architects and engineers?

Educational administrators are not expected to

be experts in structural techniques. Yet they do retain basic responsibility for the sound and economical construction of new buildings in harmony with available financing. In fact, everyone engaged in this important field assumes a share of the responsibility which includes taking full advantage of progressive building techniques. A capsuled understanding of future expectations in the construction industry will also be beneficial in evaluating the progressiveness and adeptness of architects and engineers. A check list of recent developments and future prospects follows.

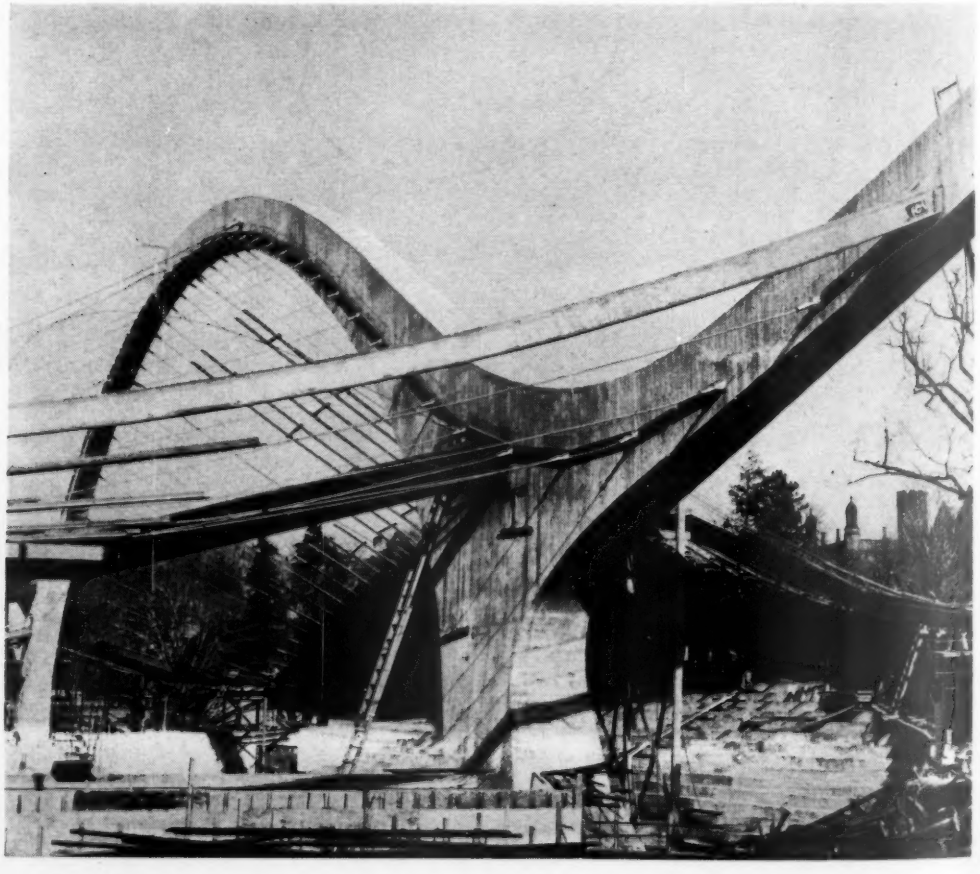
Lightness—Longer Spans

One of the lightest structural roof systems is the combination of steel deck and bar joists. The newly developed long-span steel deck is another light system in which intermediate framing beams are eliminated. When long spans are exposed and fireproofing is not required, the weight reduces to present-day minimums. But, until recently, a vermiculite plaster ceiling was the only acceptable means of fireproofing a structure of this nature. Because electrical fixtures had to be enclosed in a fireproof recess, lights burned out rapidly. A double ceiling, one for the fire barrier and the other for ornamentation, is expensive.

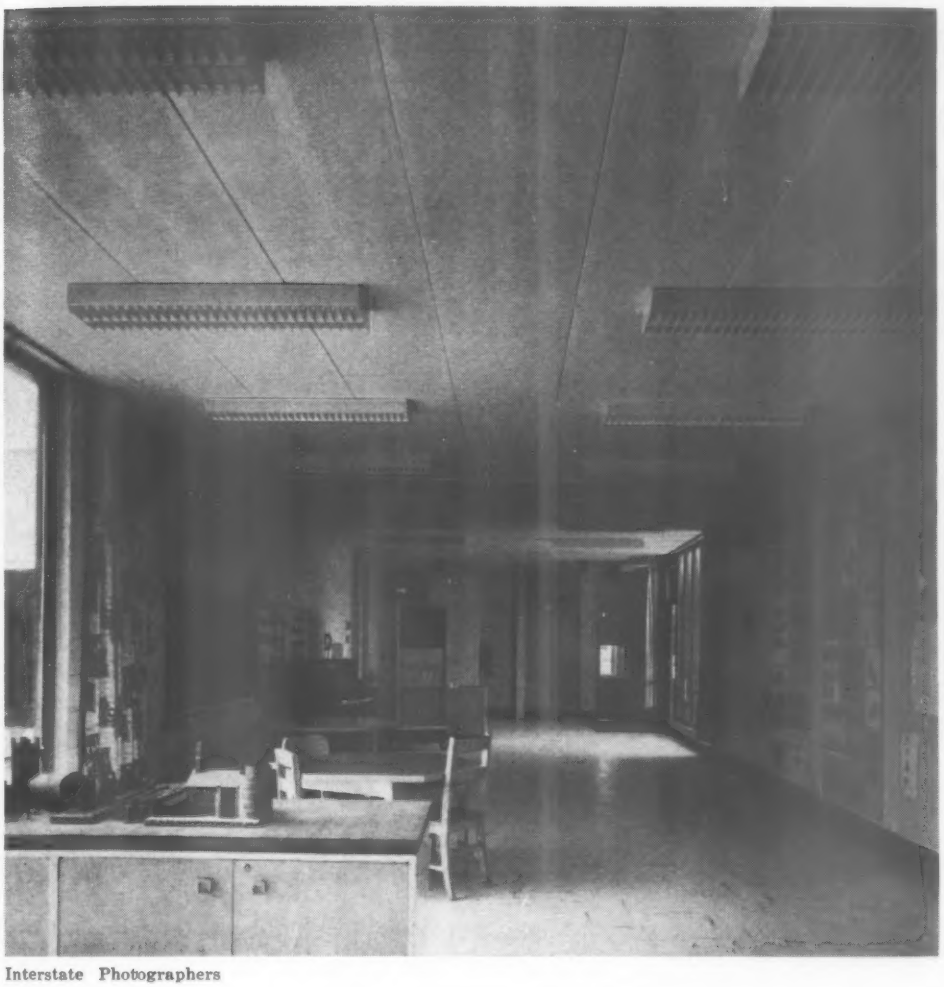
However, the technique now is to coat the steel deck with sprayed fireproofing, obviously much more economical. Going even further, tests are being conducted on a basic steel deck and beam assembly, with or without the protection of a plastered ceiling, to establish fire ratings. If these tests prove successful, further progress is at hand. It should be noted that the question of whether or not fireproofing is to be used, either in the form of sprayed materials or hung ceilings, will have to be determined by code requirements and insurance considerations.

Noise transmission is a problem if partitions terminate at the hung ceiling. A plastered ceiling is not a satisfactory sound barrier, so the space between top of partition and deck must be sealed.

Hung ceilings are not always necessary or desirable. Some architects prefer to improve the exposed construction with interesting adaptations of structural components. For example, some have used steel decks with built-in baffles, designed both for appearance and acoustical properties. Some have welded steel members together to form box beams in lieu of the joists or standard beams. Others take advantage of the natural soffit treatment of precast block slaps. One popular exposed member is the precast channel joist. The intrinsic economic benefits of these innovations are being



The Yale Hockey Rink by architects Eero Saarinen and Associates is an excellent example of the "hung roof" innovation, with its attending steel cables and concrete spines.



In the Sweetbriar Elementary School, Smithtown, N. Y., lightness and attractiveness have been achieved in the project rooms with long-span acoustical roof decks and cavity bearing walls. Ketchum, Giná and Sharp are the architects.

Interstate Photographers

proved constantly by many designers and engineers.

Prestressing and Precasting

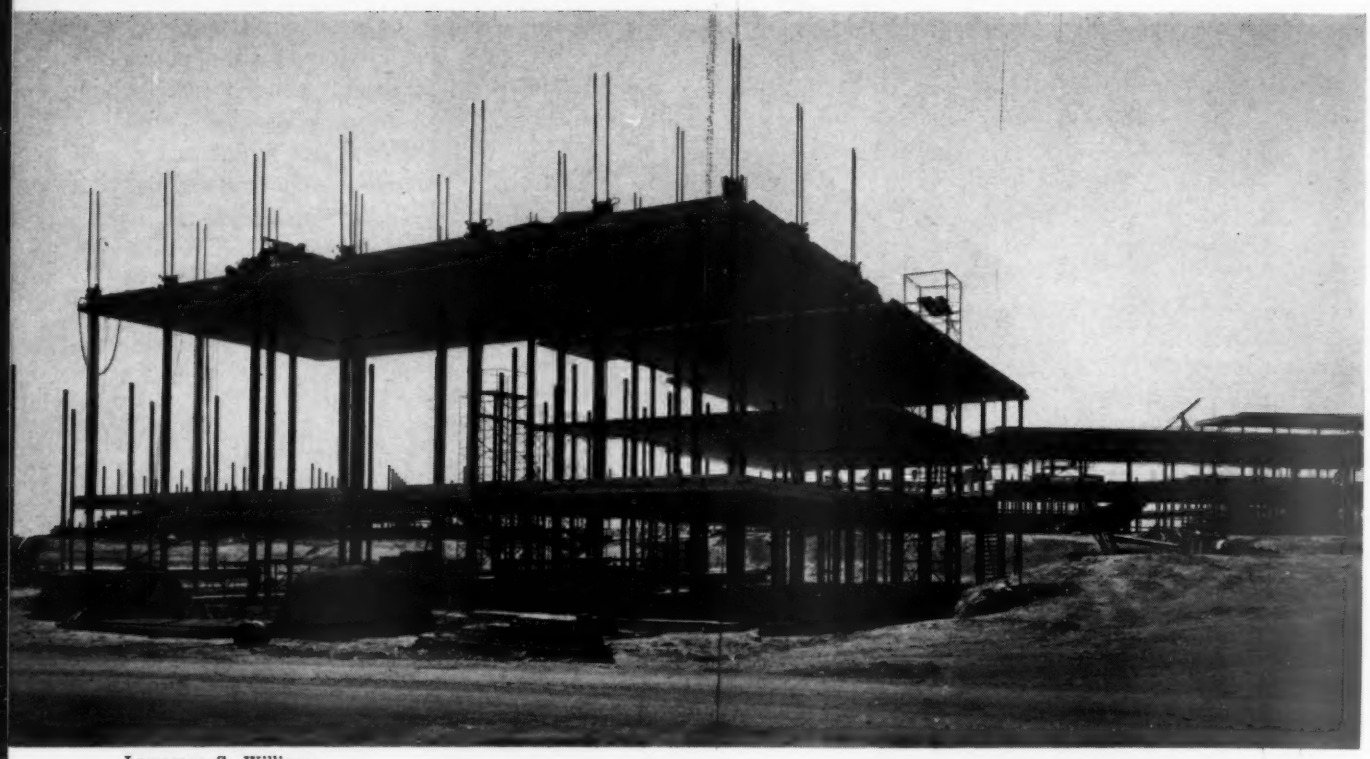
Great strides are steadily made in prestressing and precasting techniques, and in plant facilities for them. More contractors are becoming aware of the advantages of these methods. It can be predicted that the improving economic picture will push these methods to the forefront in school construction. Highly mechanized plants, with greater capacities, have been built and will alter the production picture substantially in the near future. Obviously, other plants will have to follow suit, if they are to remain competitive. Many of the earlier difficulties, such as excessive and non-uniform cambers of the prestressed joists, are being resolved with improved know-how and experience.

Panel Walls

In the field of metal, precast concrete and laminated wood panels, the activity is feverish. However, mistakes are still occurring in some assemblies. If the panel is a new product, it is advisable to analyze it from all angles every step of the way. On the other hand, if the assembly has already been used, its previous behavior should be carefully studied before it is accepted. There have been difficulties with warping, condensation, reflection, staining and sometimes with inadequate connections to the building frame. The problem of creaking noises, caused by temperature variations, should be noted and solved.

Standardization of Elements

In England the exigency for economical schools has been resolved wtih standardization. The Hertfordshire schools, about one hundred in number, are a good example of this technique. All are built on the basis of a three-foot, four-inch planning grid. Exteriors vary in accordance with the local economic situation and the whimsy of the architect; however, the interiors are rigidly fixed by the planning module. In many instances, precast concrete plates, three feet, four inches square, serve as the structural floor. Wood flooring is usually added for the wearing surface. In other areas of England, counties have pooled their technical re-



Lawrence S. Williams

Lift slab technique is used to erect Radio Corporation of America's offices and plant in Cherry Hill, Pennsylvania. Architect is Vincent G. Kling.

sources for a united research effort in this field, since individual counties could not sustain the financial burden. The "CLASP" system is one result of this type of endeavor.

Architect Roger Halle of New York City has been engaged for some time on a system embodying some of these general characteristics. We should remain attentive to such developments as schools lend themselves admirably to basic standardization of this kind. It might well be an important sign post.

Lift Slab

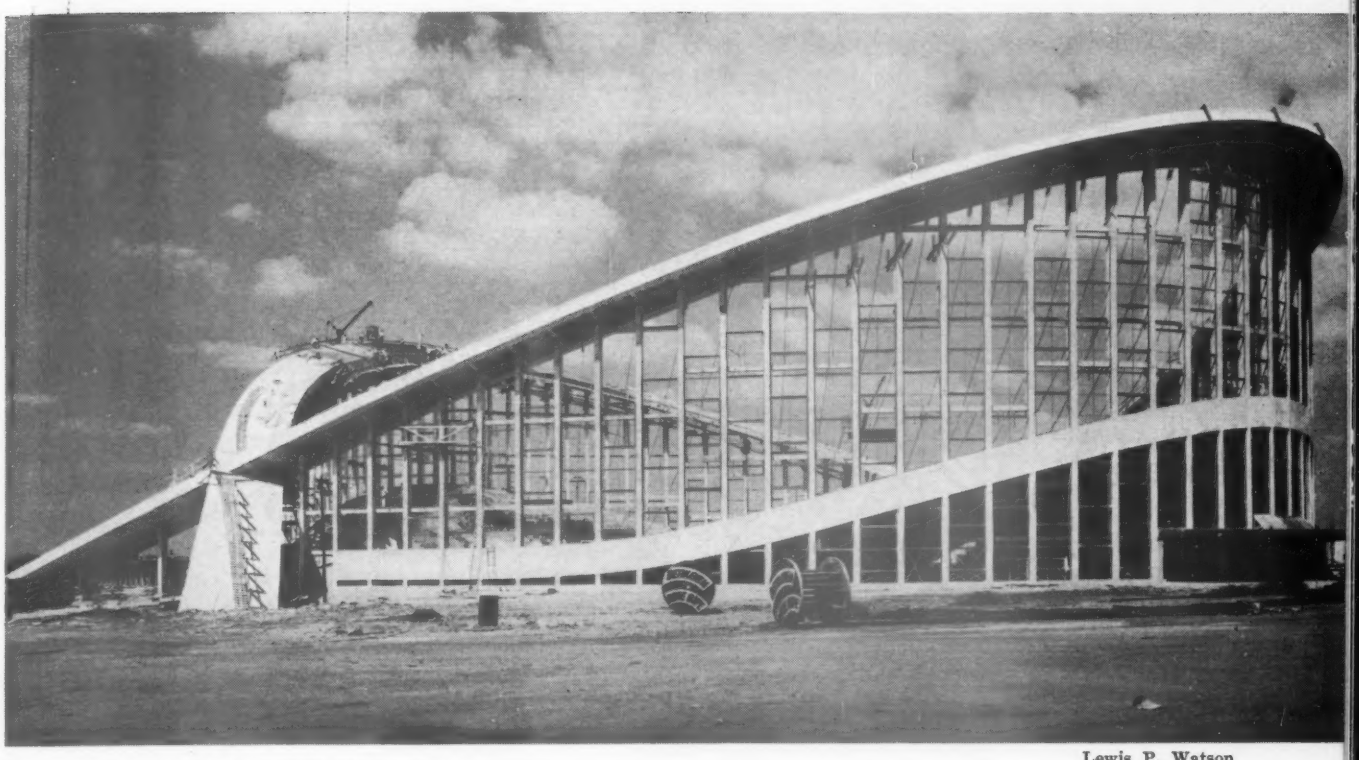
The lift slab technique has gained in acceptance and construction details have improved greatly in the realm of coordination, the key to its success. The advent of concrete columns, in lieu of the conventional wide flange or pipe, and more efficient shear heads for slab to column connections are examples of progress. Contractors are learning to exploit the benefits of slab on ground construction. Electrical and mechanical work is now incorporated into the slabs when they are poured at ground level.

The concept of raising building materials simultaneously with the slabs has been further developed. Both outside walls and partitions are considered here. Although the idea has already been projected by us for several buildings, so far as we know the only other use has been in Russia. Yet, there is no reason why the technique could not be accomplished immediately in this country. The savings in time and money are obvious.

To overcome local prejudices it is advantageous to show bidders films of previous lifting operations. They are then able to visualize and understand the operations and shortcuts. The confidence gained by observing the unusual technique in action is reflected in their bids. In fact, we have found such film presentation beneficial not only in connection with lift slabs, but also with other construction innovations.

Shells and Folded Plates

Great savings are claimed for shells and folded plate construction, but the systems are presently used more for effect than economy. The importance of the effect is not denied; environment is important to a student's development and training. However, recent techniques of precasting, that eliminate formwork, have reaped financial benefits. For instance, barrel roofs can be precast in layers on the



Lewis P. Watson

Livestock Judging Pavilion in Raleigh, North Carolina, was constructed with a cable roof installation. Project was designed by William Henley Deitrick in association with Matthew Nowicki.

ground and lifted into position by the vacuum method. The result is structures of low cost.

We believe that conventional forming procedures for shells and folded plates will become passé, and rightly so. Formwork and falsework for these intricate shapes are quite expensive, particularly so when they are high off the ground.

Hung roofs are economical for long span structures, but have not found their way into educational construction on a large scale. It has been reported that hung roofs can now be applied to square or rectangular buildings, but this development is not yet widely publicized. Working stresses of the cables used are more than three times that of ordinary steel, so these roofs offer potentialities for spanning large areas. With smaller spans, the fittings at the cable ends are more costly. However, these fittings are steadily becoming simpler and more economical, and it is expected that this construction medium will gain in popularity, even for smaller spans.

Strubing-Strub

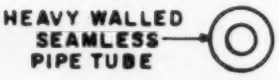
Strubing-Strub (registered trade name) is based on the method of flat rolling heavy walled, seamless tubes and later inflating them to form a pipe with or without two fins. The expanded strubs are shipped to the site in coils. They are rolled out like ribbon, cut to the proper length, placed in the correct position in the frame, and then inflated. The rolled material comes in lengths as long as one thousand feet.

Strubing was invented by Howard A. Fromson and the rights in the United States and Canada are held by Calumet and Hecla Inc. The material can be either aluminum or steel. At present we are specifying strubing in a radio telescope of large dimensions. There the flexibility of the ribbon and the absence of joints are a great advantage. By applying this technique to shells, folded plates and domes, formwork can be eliminated. Our firm is presently working on a dome to be constructed, using strubing, in the following manner:

a. A circular concrete tension ring is to be poured near the ground.
b. The strubing is laid in a three-directional, equilateral triangle, forming a mesh which is connected to the ring.
c. A balloon is inflated under the center of the intersecting mesh to give the strubing the proper start in order to achieve the final form.
d. The strubing is then inflated throughout to

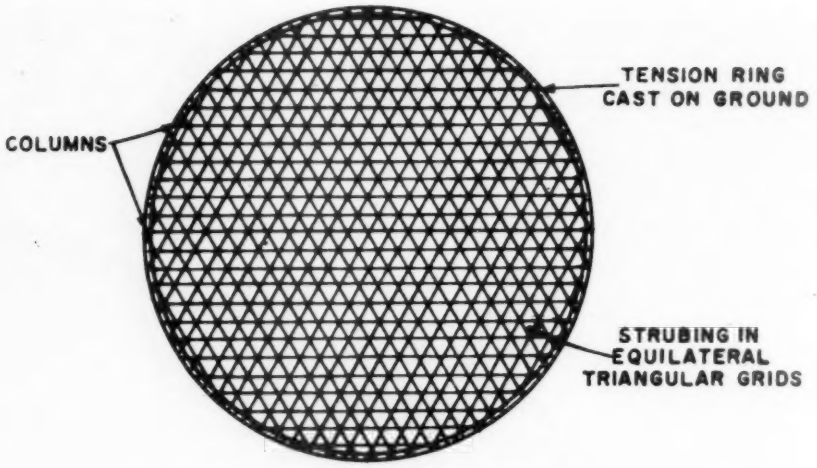
INFLATED

IN RIBBON FORM

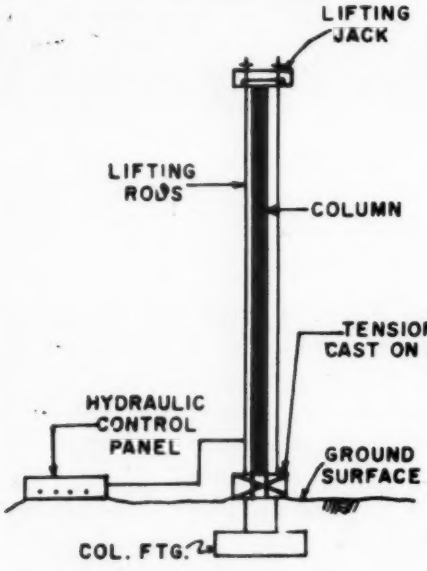


INITAL CONDITION

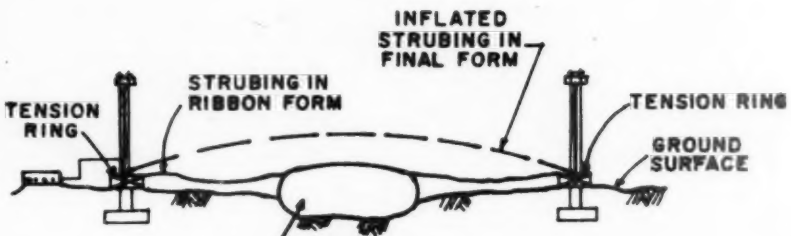
STRUBING



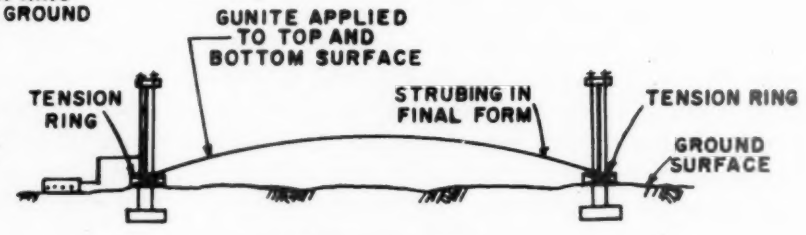
PLAN OF DOME ROOF



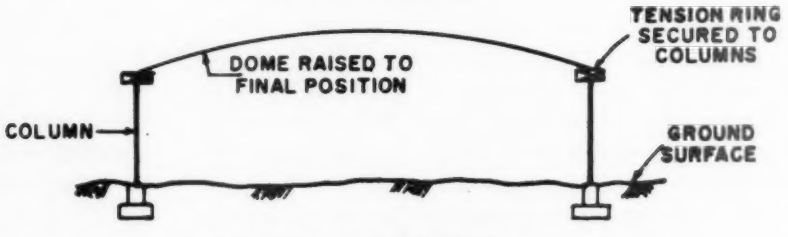
COLUMN AND RING PRIOR TO STRUBING INSTALLATION



STAGES I & II



STAGE III



FINAL STAGE

The firm of Severud-Elstad-Krueger Associates is presently working on a dome to be constructed with strubing as detailed above. When this technique is applied to shells, folded plates and domes, formwork can be eliminated. Material for the strubing is either aluminum or steel.

form a triangular network support for the dome roof.

e. It serves as the form and permits various materials to be incorporated with this network to create the dome surface, such as gunite, poured concrete, etc.

f. The whole assembly is raised by lift slab method on columns spaced around the tension ring.

Inflation Technique

Swimming pool enclosures and exhibition structures have been successfully executed by inflating the roof with overpressure from within the building. However, such construction would hardly be applicable to school construction, since it is of temporary nature. A variation of the inflation concept consists of semi-circles of "inner-tubes" arranged side by side. This assembly is then covered top and bottom with fabric, and each cell is separately inflated. With proper anchorage, such a structure can be given the desired shape and serve as the form for applying gunite.

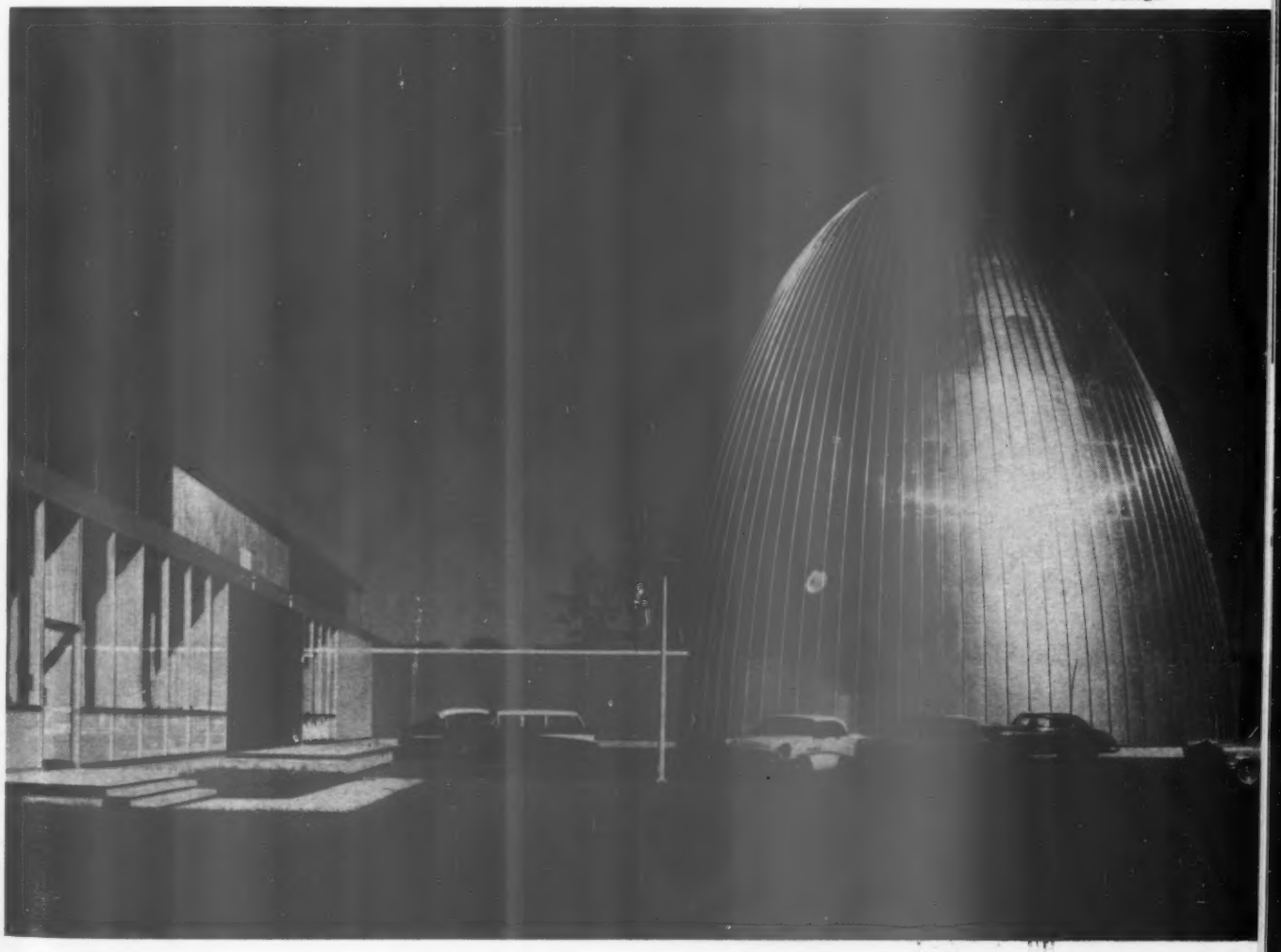
The technique is versatile and will, we believe, become generally accepted very soon. As an aside, we would like to mention that this method, in a modified form, is being projected for a retractable roof. Through its lightness and ease of operation, it offers great promise for this objective and is within economic reach.

Foundations

Since the war the techniques and experiences in the practice of soils engineering and soils mechanics have probed deeply into the nature of the earth. Mother Earth is as fickle as any woman, therefore any progress in obtaining information about the sub-structure is of great importance, not only in designing a structure, but also in selecting a suitable site.

The Industrial Reactor Laboratories of Plainsboro, N. J., have an eye-catching application of light metal skin roof over a partially gunited shell structure. Skidmore, Owings & Merrill, architects.

Alexandre Georges



Geophysicists have carried out soil explorations which enable us to uncover many of the earth's secrets. There are four major types of geophysical surveys: the seismic method, the electrical method, the gravity method, and the magnetic method. These methods consistently find their way into the building field and are becoming time-tested. They are important tools in properly evaluating ground conditions and making the most of them.

Building sites that were once considered uneconomical are now becoming usable through modern developments in exploration and consolidation techniques. Today, for example, we can physically consolidate or compress soils which were once unacceptable as bearing material. Under certain circumstances, the ground can be petrified chemically for proper bearing capacity.

Red Flag Warning

When venturing into an untried field in a certain locality, a project may be jeopardized by lack of enterprise and enthusiasm on the part of available builders, lack of skilled workmen, resistance of building department officials, scarcity of materials, transportation problems and union regulations. Each factor must be carefully evaluated. Jurisdictional labor disputes can raise havoc with completion dates and costs.

In Conclusion

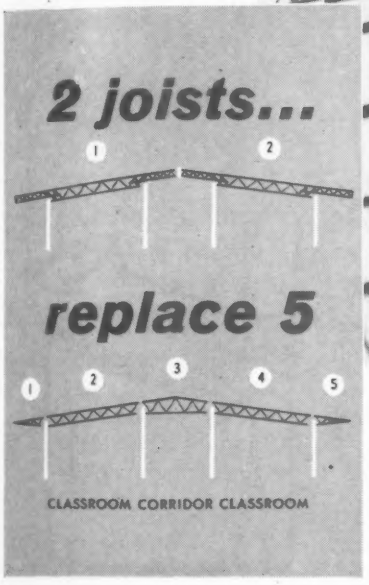
The impact of technology on construction techniques has been exciting and penetrating in the last two decades. All those concerned have combined their talents in the search for beauty, improved function and economy in buildings. Such continuing teamwork makes the impossible possible and the impractical practical. Thus man's vision has constantly enlarged as new horizons are opened in the field of construction. Thanks to science, man's grasp no longer exceeds his reach.

Construction process of the Secondary Technical School, Worthing, Sussex, England, is prototype of a prestressed concrete, prefabricated system.

Courtesy Central Office of Information, London

LACLEDE STEEL COMPANY

Saint Louis, Missouri



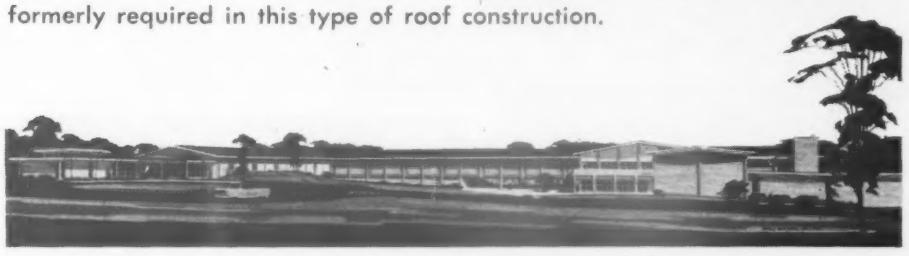
LACLEDE 34′ OPEN WEB STEEL JOISTS

cut time and cost in new school construction

Ladue Junior High School in suburban St. Louis is an excellent example of the way economy and style can be blended in today's school construction.

Cost saving was a pre-eminent factor in architect William B. Ittner's design of this low-flung structure, with its long straight runs, free of costly jogs and bends. Further economy was achieved by allowing the rolling terrain to fall away from the single continuous ridgeline, rather than to follow the contours of the ground with multi-level roofs.

This design concept was based on the selection of open web steel joists as a versatile, economical structural material. Laclede 34′ joists, with special shallow-depth ends, were used to provide an unbroken slope from ridgeline to cantilevered overhang, two joists replacing the five structural elements formerly required in this type of roof construction.



General contractor on the project was Kloster Company. Neal J. Campbell was consulting engineer.

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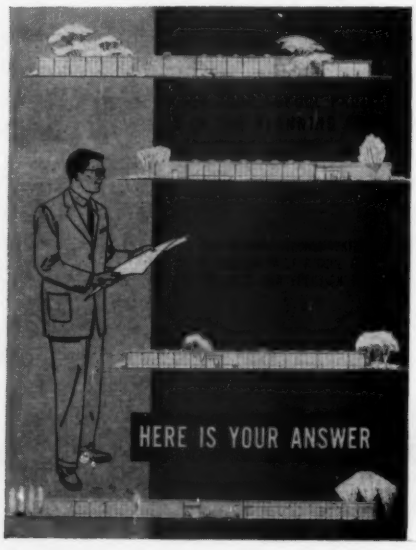

This 12-page booklet gives you the complete facts on the most practical solution available for the construction of modern, fire-safe, permanent school plants.

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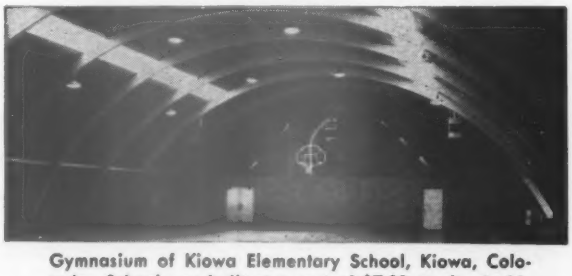
W822 First National Bank Building, St. Paul 1, Minnesota
District Offices: Tacoma, Wash., Fort Wayne, Ind., Linden, N. J.

Banner County High School, Harrisburg, Nebraska was built for $10.24 sq. ft. including all fixed equipment. Architect: Robert Ditzen; Contractor: Fullen Construction Co.

Total cost was $7.75 sq. ft. to construct St. Joseph's School, McPherson, Kansas. Architect: Robert E. Marr; General Contractor: Frank Jackson.



Gymnasium of Kiowa Elementary School, Kiowa, Colorado. School was built at a cost of $7.30 sq. ft. Architect: Robert W. Ditzen; Contractor: Broadway Construction Co.

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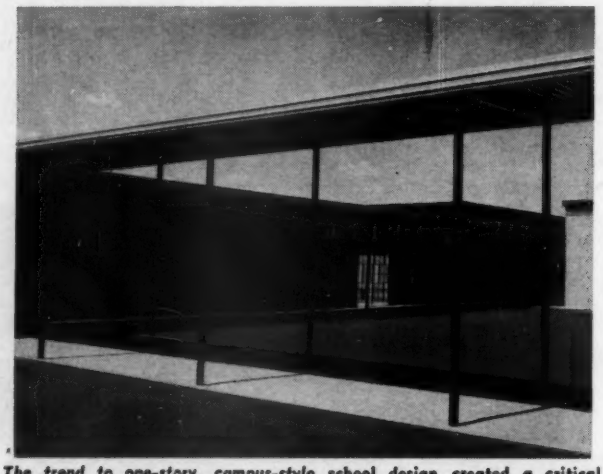
Washington school saved $10,212.50 with architect-designed Childers Walkway Covers without sacrificing appearance or quality. Covered walkways are among the many features that add to the appearance and convenience of the new Sunset Elementary School, Bellevue, Washington.



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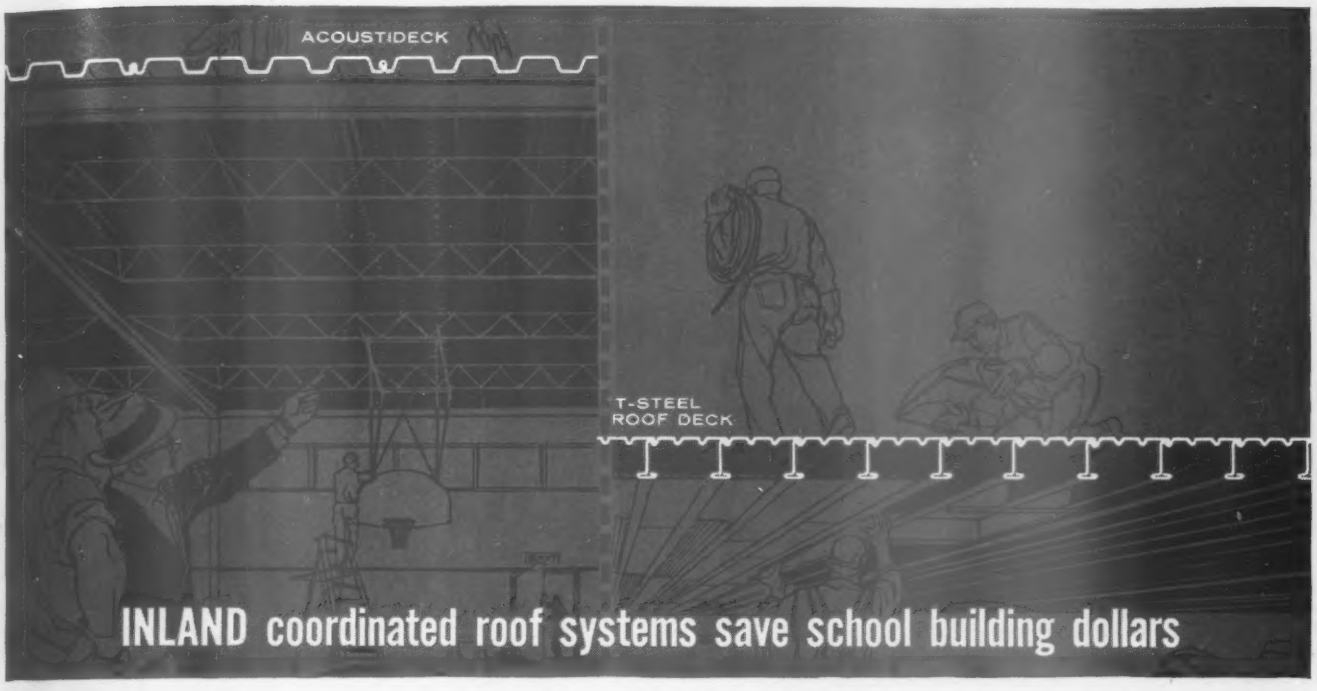

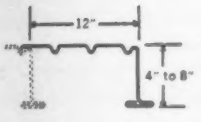

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Ceiling Treatments with T-Steel Deck

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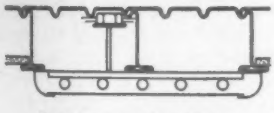
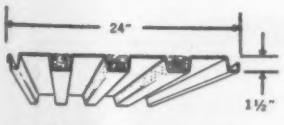
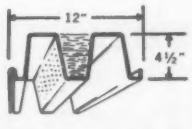


Surface-mounted Fixture — Lath-and-Plaster Fireproofing



TYPE B ACOUSTIDECK—For purlin spacings to 10'. Uses minimum of 1" rigid insulation board.



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Panels are erected fast in any weather that a man can work. Since the panels are Bonderized, then covered with a baked-enamel prime finish, field-painting costs can be cut in half because only one finish coat is required normally. The fluted underside is left exposed as an attractive ceiling.

New T-Steel Roof Deck allows you design freedom in covering classrooms of 26' to 32' spans. You can specify various types of acoustical tile — provide a flush, luminous ceiling — or leave the underside of T-Steel exposed and paint it. You provide a superior diaphragm to resist seismic and wind thrusts.

For help on unusual problems, you can draw on the diversified experience of Inland Sales Engineers. Call your nearest Inland office. *Write for catalogs 240, 241, and 246.* EP-7

member of the INLAND steel family

ENGINEERED PRODUCTS DIVISION

INLAND STEEL PRODUCTS COMPANY

Dept. C-4105 West Burnham Street, Milwaukee 1, Wisconsin

ATLANTA, BALTIMORE, BUFFALO, CHICAGO, CINCINNATI, CLEVELAND, DALLAS, DENVER, DETROIT, HOUSTON, KANSAS CITY, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, NEW ORLEANS, NEW YORK, ST. LOUIS

ACCURATE METAL WEATHER STRIP CO., INC.

DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES

Efficient Weatherstripping for all types of wood and metal windows and doors.

Various types and sizes of "ACCURATE" METAL WEATHER STRIPS places us in an ideal position to cooperate with school Architects and Executives in meeting their requirements.

TYPES AND QUALITY OF MATERIALS: Zinc and Bronze materials are ordinarily used depending upon atmospheric conditions.

THE COMPANY: The "ACCURATE" METAL WEATHER STRIP COMPANY has been manufacturing metal weather-strips for over 50 years and today it is outstanding in the industry.

ACCURATE

See our CATALOG in SWEET'S FILE

MANUFACTURING FACILITIES: Owing to unusually efficient manufacturing facilities, personal supervision and complete control of every step in fabrication, purchasers of "ACCURATE" METAL WEATHER STRIPS are assured of prompt service and dependable workmanship.

ARCHITECTURAL SERVICE: Satisfactory results from weather strip depends upon three major factors:—(1) quality of equipment, (2) selection of equipment designed to meet the individual conditions and requirements, and (3) proper installation. Where time permits, we strongly urge that you permit us to submit complete and specific recommendations.

"ACCURATE" SERIES NO. 30 EQUIPMENT RECOMMENDED FOR SCHOOL WINDOWS

Heavy Double Hung School Windows Require Substantial Weather Strips

Large double hung windows such as those used in schools require a weather strip designed especially for this type and size of window. It is a waste of money to specify a light weight strip which is not designed for this type of heavy-duty service.

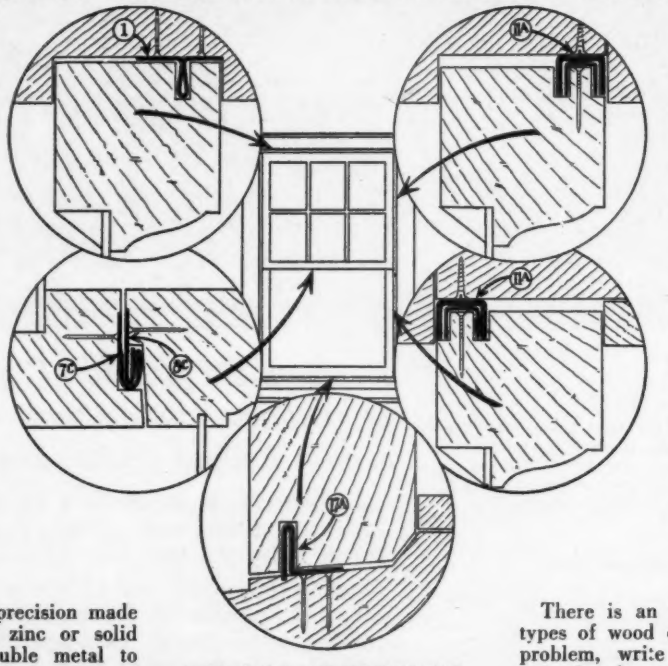
"Accurate" Series No. 30 Equipment

This series is designed especially for schools. It will stand up and take considerable abuse due to its shape and the heavy gauge metal used in its manufacture.

All parts of the equipment are precision made of heavy gauge special tempered zinc or solid bronze as specified. It has a double metal to metal channel slide on the vertical edges of sash. The channel on the pulley stile is a heavy 16-gauge channel in which the sash channel slides. As the channels operate metal to metal, they have to operate perfectly as there is no chance for the mechanic to install them in any other way.

It will always hold its contact if applied with screws and not nails.

The narrow channel makes it possible to get to the sash weights easily. If it is necessary to remove the channel, it is rigid enough to hold its shape and can be replaced in the same position by using the same screw holes.



SERIES NO. 30 EQUIPMENT

For Other Types of Windows

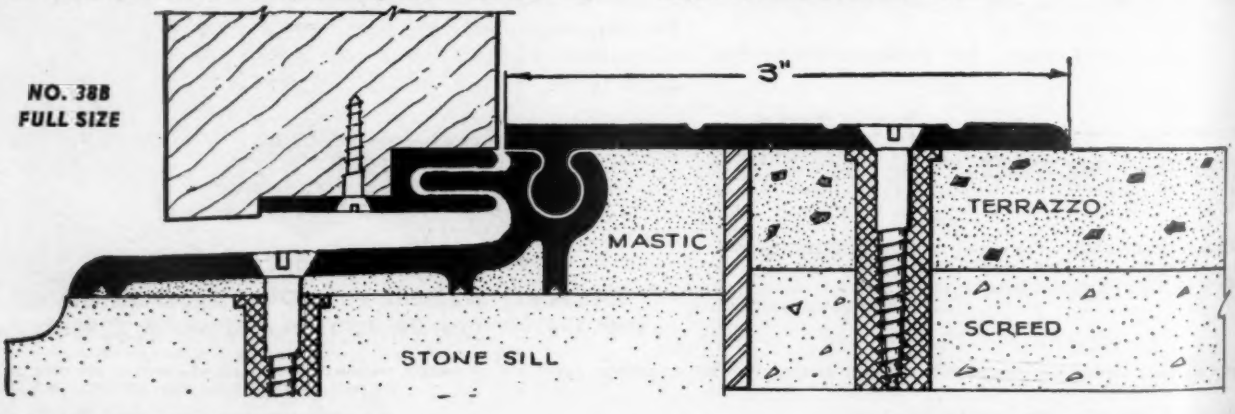
There is an "Accurate" weather strip for all types of wood or metal windows. If you have a problem, write to us for the proper weather strip for the condition.

ONE OF MANY TYPES OF "ACCURATE" EXTRUDED BRONZE SADDLES

"Accurate" also specializes in extruded bronze door saddles. Each saddle is designed for a specific condition and a saddle can be selected for practically any door condition.

"Accurate" No. 38B extruded bronze saddle is designed for exterior doors opening out. It is practically flush with the floor and its flat top surface does not interfere with the use of panic bolts. This saddle is also available in aluminum.

A complete series of saddles for use with exterior sliding doors will be found in our catalog in Sweet's. Availability of all metals subject to Government restrictions.



THE WILLIAM BAYLEY COMPANY

Springfield, Ohio — 1200 Warder St.
New York 17, N. Y. — 280 Madison Ave.
Chicago 2, Ill. — 105 W. Madison St.
Washington 5, D. C. — 1426 "G" St., N.W.

Factories: Springfield, Ohio

Bayley Windows and Curtain-Wall Systems

STEEL

Heavy Intermediate Classroom Window
— designed for large, fixed light glass area, combined with adequate indirect, no-draft ventilation.

Commercial Projected Window
— especially suited where requirements call for quick shipment of a good, economical window.

Heavy Intermediate Projected Window
— for use in buildings in which large amount of ventilation is desired. Prepared for screens.

Horizontal Pivoted Window
— designed for permanence and low maintenance. Inside glazed only. Not screened.

Heavy Intermediate Casement
— single or double outswing, or combination of outswing and projected-in. Permits use of blinds, shades and draperies.

Curtain-Wall Systems
— permits wide variety of wall treatments including shadow-line effect, with choice of panel location and colors.

Architectural Projected Windows
— combines quality features of Heavy Intermediate Window, with economy and simplicity of design.

Continuous Windows and Operators
— pivoted, project or top-hung ventilators — tension or rack and pinion type operation — manual or motor actuated.

Aluminum

Classroom Window
— large, fixed light glass areas combined with desired amount of indirect, no-draft ventilation. Simple, easy to operate hardware.

Ribbon Window
— usable with all types of construction materials. Sub-frames and imposts integral. Projected-in or projected-out ventilators.

Projected Window
— a top quality window with carefree life that is especially preferred when an abundance of ventilation is desired. Will accommodate ½" insulating glass.

Curtain-Wall Systems
— pre-engineered vertical or horizontal systems in depths of 1½" to 7½". Choice of panel type, location and color. Permits individualized wall treatment.

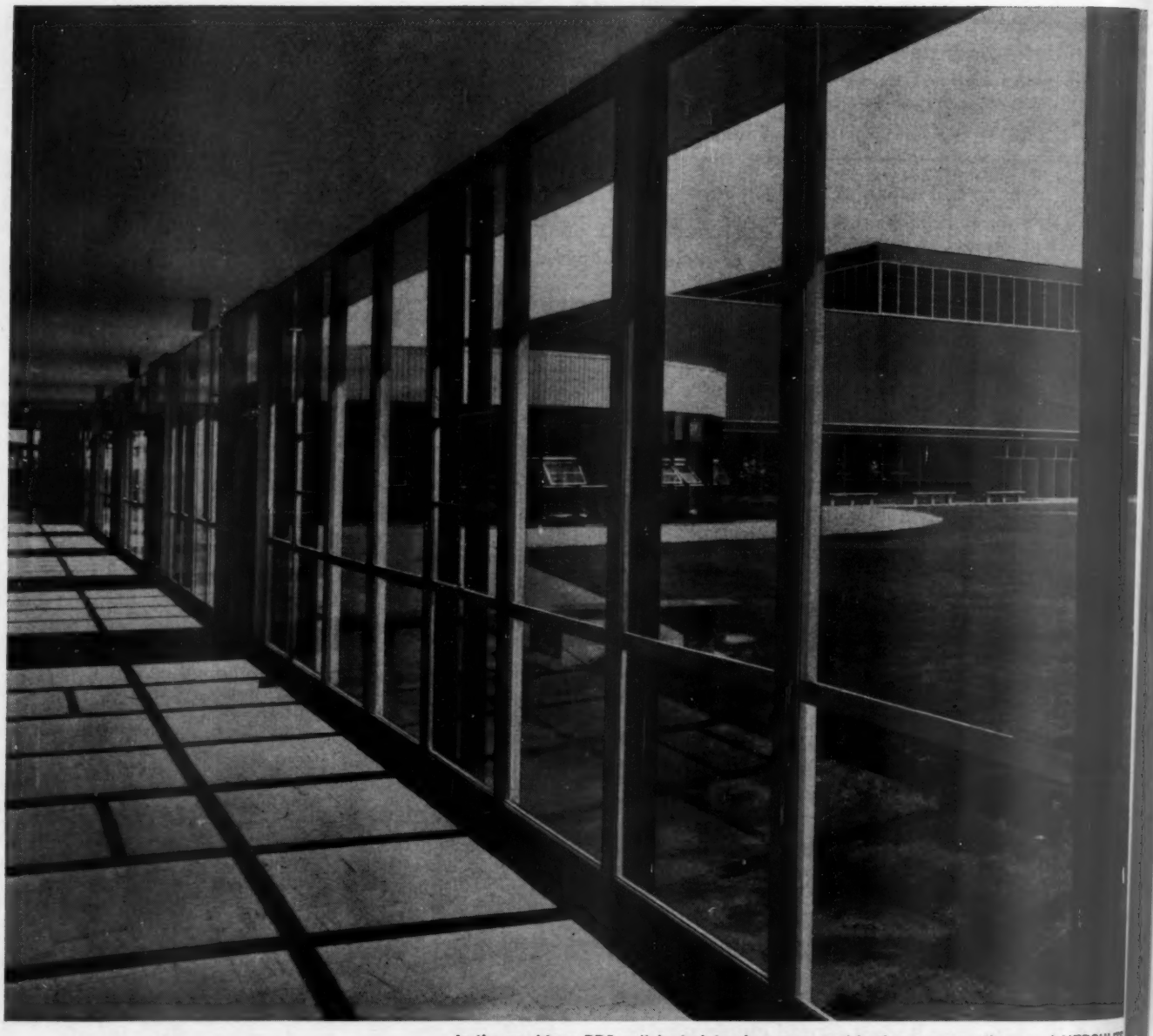
We can counsel with you on how to:

- **Work to your budget — and obtain quality**
- **Achieve originality of your wall treatment**
- **Individualize your building's appearance**
- **Meet all functional requirements**
- **Avoid design rework and custom fabrication**

You can also gain substantially from this counsel of experienced Engineers — supported by a financially responsible 80 year old organization with complete manufacturing and erection facilities — when you call in Bayley to assist on your current or contemplated projects. You will be working with a company known for other services and customer-relation policies that provide extra benefits from the building's inception to its acceptance. Write or call. The nearest Bayley Representative will be glad to cooperate with you.

PITTSBURGH PLATE GLASS COMPANY
Pittsburgh, Pennsylvania

SOLEX® glass protects their eyes



In the corridors, PPG polished plate glass was used in the upper sections and HERCULITE shock-resisting tempered plate glass was below where damage could occur.

Architects and Engineers: Charles F. Behrensmeyer & Frank W. Horn, Quincy, Illinois
Contractor: Simmons Construction Company, Decatur, Illinois

HERCULITE® protects the school

Large expanses of glass create a feeling of unlimited spaciousness in the new Quincy, Illinois, Senior High School. Glass performs many practical functions, too. PPG SOLEX green tint, glare-reducing, heat-absorbing glass not only protects young eyes from solar glare but keeps classrooms cooler in summer. HERCULITE tempered plate glass, because it is four to five times stronger than regular plate glass of the same thickness, provides plenty of impact resistance in corridor areas likely to receive the most abuse.

Polished Plate Glass, SOLEX and HERCULITE are deftly woven into the design to produce a brilliant, modern look which opens the building to the whole outdoors.

For more information on any of these products, write Pittsburgh Plate Glass Company, Room 1150, 632 Fort Duquesne Boulevard, Pittsburgh 22, Pennsylvania.

The driver training classroom gets plenty of light but glare and solar heat are greatly reduced by SOLEX green tint plate glass.

TUBELITE doors, surrounded by large panels of PPG polished plate glass, accentuate the open-vision theme.

PPG glass products for schools:

SOLEX® Plate Glass—green tint, heat-absorbing, glare-reducing glass
SOLARGRAY® Plate Glass—a neutral gray, heat-absorbing, glare-reducing glass
PENNVERNON® Graylite™—a neutral gray, heat-absorbing, glare-reducing, heavy sheet glass
HERCULITE®—shock-resisting tempered plate glass
TWINDOW®—the world's finest insulating window
Polished Plate Glass—for clear, true vision
PENNVERNON® Window Glass—window glass at its best

Pittsburgh Plate Glass Company

Paints • Glass • Chemicals • Fiber Glass
In Canada: Canadian Pittsburgh Industries Limited

MARMET CORPORATION

314 Bellis Street, Wausau, Wisconsin

NOW! new comfort next to walls

a virtual end to condensation or heat loss

through aluminum window-walls

NON-HUMID AREA

exclusively from **MARMET** NEW INSU-WALL

standard 6442-6602

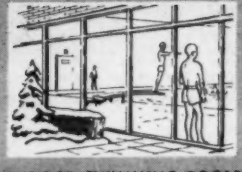
integrates with non-insulated 6442-6602 gridwall to hold down cost per foot.

insu-wall 8442

HUMID AREA

CAFETERIAS, LABORATORIES

By minimizing temperature differences between interior aluminum and humid inside air, INSU-WALL ends the condensation problem arising from steam tables, or laboratory vapors.

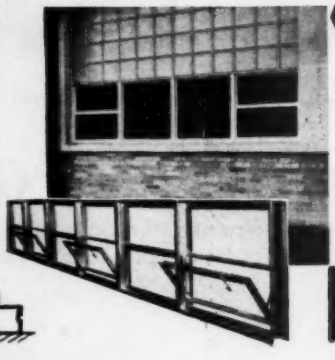


INDOOR SWIMMING POOLS

In many cases the esthetic effects of daylighted, curtain-walled, swimming pools can be maintained without frost or heavy condensation.

In climates with severe winter temperatures, aluminum curtain-wall's many advantages can now be utilized without condensation build-up or heat loss through the metal. MARMET's new INSU-WALL retains the beauty and permanence of finish offered by an aluminum curtain-wall . . . yet cuts heat losses through the high conduction factor of this metal by as much as 63%! Students can now be comfortable next to curtain-wall without installing more expensive perimeter heating. Cafeterias, swimming pools, domestic science rooms, laboratory rooms and other high humidity areas can take advantage of curtain-wall *daylighting* without the problem of condensation forming on interior wall metal.

Best of all MARMET's INSU-WALL requires no added labor assembly cost on the job site! It uses a standard split mull assembly system and can be integrated with MARMET's low cost non-insulated 6442-6602 curtain-wall in one unbroken line . . . keeping cost per square foot to a minimum, in sections of the building where insulated curtain-wall is not required. Make sure your architect has full information on INSU-WALL for your next school building.

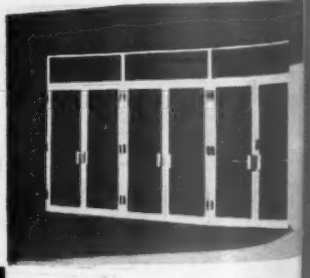


Series 2442 RIBBON WINDOWS
Ideal for classrooms with glass block

Provides a complete set of fixed and operating lites in one frame section to cut window installation costs. An attractive, modern looking classroom window with diffused light through glass block above.

New Series 2200 Doors

New extra slim stile doors available in economical standard sizes with matching modular sized entrance frames. Provide beautiful entrances on a budget.



MARMET CORPORATION

314 Bellis Street Wausau, Wisconsin

FORSE MANUFACTURING COMPANY

2347 Sullivan Avenue, St. Louis 7, Missouri

Forse WEARPROOF Shades

The Shades that Refuse to Wear Out

For over 40 years, Forse Wearproof Shades and Draperies have been used in schools, hospitals, churches, auditoriums, office buildings—wherever quality, economy and long trouble-free service are paramount requirements. They are built to stand up under hard constant use and to eliminate the expense of replacement for many years. All Forse Wearproof Shades are guaranteed for 10 years. Many users report that their Forse shades are still giving satisfactory service after 20 years or more.

Advantages

Low first cost — Low maintenance cost
No cracking or checking
Pre-shrunk — Fast colors
Made to measure
Guaranteed for 10 years

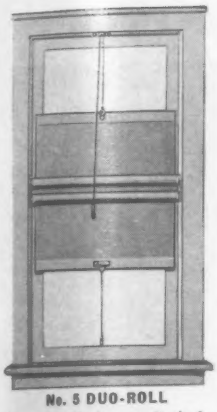
Write for literature and material samples

Forse Wearproof Fabrics

are the finest, most durable shade materials available. They are made from long staple canvas type cotton cloth, specially processed and dyed to our specifications, and weighing 9 oz. or more per sq. yd. The materials contain no paint, plastic or loading of any kind, can never crack or check and will retain their color and texture for many years. You can wash or dry clean them repeatedly. Available in decorator colors, Forse translucent fabrics will admit soft pleasant light while keeping out the glare.

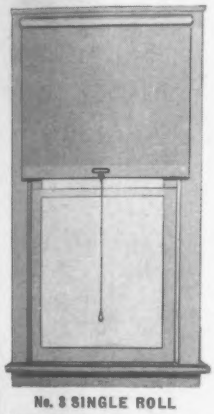
Forse Wearproof Darkening

is extremely close weave 10 oz. cloth, specially treated and dyed to provide best quality yet reasonably priced darkening shades and draperies. Its darkening properties are developed from the special tight weave and the dyes used and the finished fabric contains no filler, paint or coating. Forse Wearproof Darkening is practically light proof, is soft and pliable at any temperature and will retain these qualities for the life of the fabric. Available in attractive colors to harmonize with your other appointments.



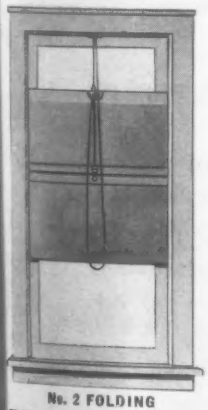
No. 5 DUO-ROLL

Duo-Roll Shades permit shading upper and lower sections of windows independently of each other. Upper shade is adjusted by a long cord and lock pulley at the top of the window. A metal light shield covers the space between the two rollers.



No. 3 SINGLE ROLL

Recommended for small windows. Also available in Pull-up Type with lock pulley at top of opening or sash. Easily installed on French, austral, tilting sash and transom windows.



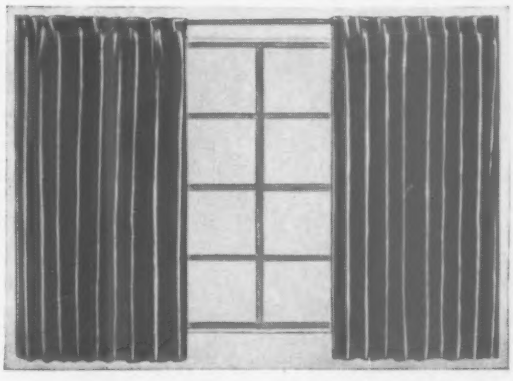
No. 2 FOLDING

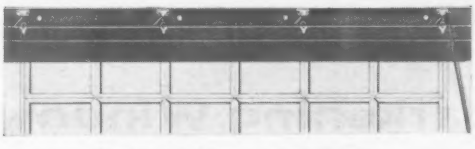
Folds and adjusts up and down by a continuous cord and two lock pulleys. Ordinary-size shades have a slat at top and bottom and two intermediate slats. Long shades have additional intermediate slats.

DARKENING DRAPES

These draperies are made from Forse Wearproof Darkening Materials. They will provide effective and attractive installations over glass block and other wide windows and window groups. Generous overlaps are recommended at top and bottom of windows and they should usually be several feet wider than the openings to be covered.

Translucent draperies for control of light and glare are also available.

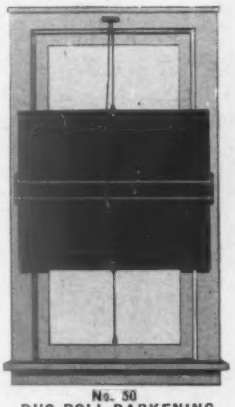




Above—FOLDED Below—OPEN

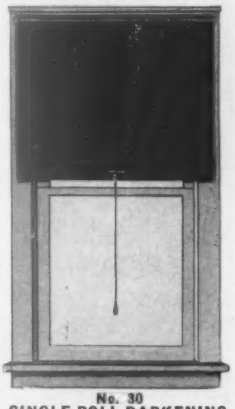
No. 10
FOLDING DARKENING

A most economical shade for darkening large windows. Single shades will cover windows up to 15 ft. wide. Very wide windows (over 15 ft.) require multiple-unit overlapping shades. No. 10 shades hang snugly against wall or casings and provide an excellent darkening installation. They are easily raised and lowered by cords and secured in the desired position by cleats at the side or bottom of the windows. When not in use, they fold at the top of the windows where they cannot be damaged. Whenever possible, No. 10 Darkening Shades should overlap openings at least 6 inches on each side. The height should be about 12 inches greater than opening height and they should be attached about 9 inches above the top of the window openings.



No. 50
DUO-ROLL DARKENING

Can be used as a multi-purpose shade when darkening requirements are not too severe. A good shade for high narrow windows. Space between the rollers is covered by a metal light shield.



No. 30
SINGLE ROLL DARKENING

Excellent for darkening small and ordinary size windows. For best results, the cloth should overlap the openings at least 3 inches on each side. Also available in Pull-up Type with lock pulley at top of opening.

No. 20
FOLDING DARKENING

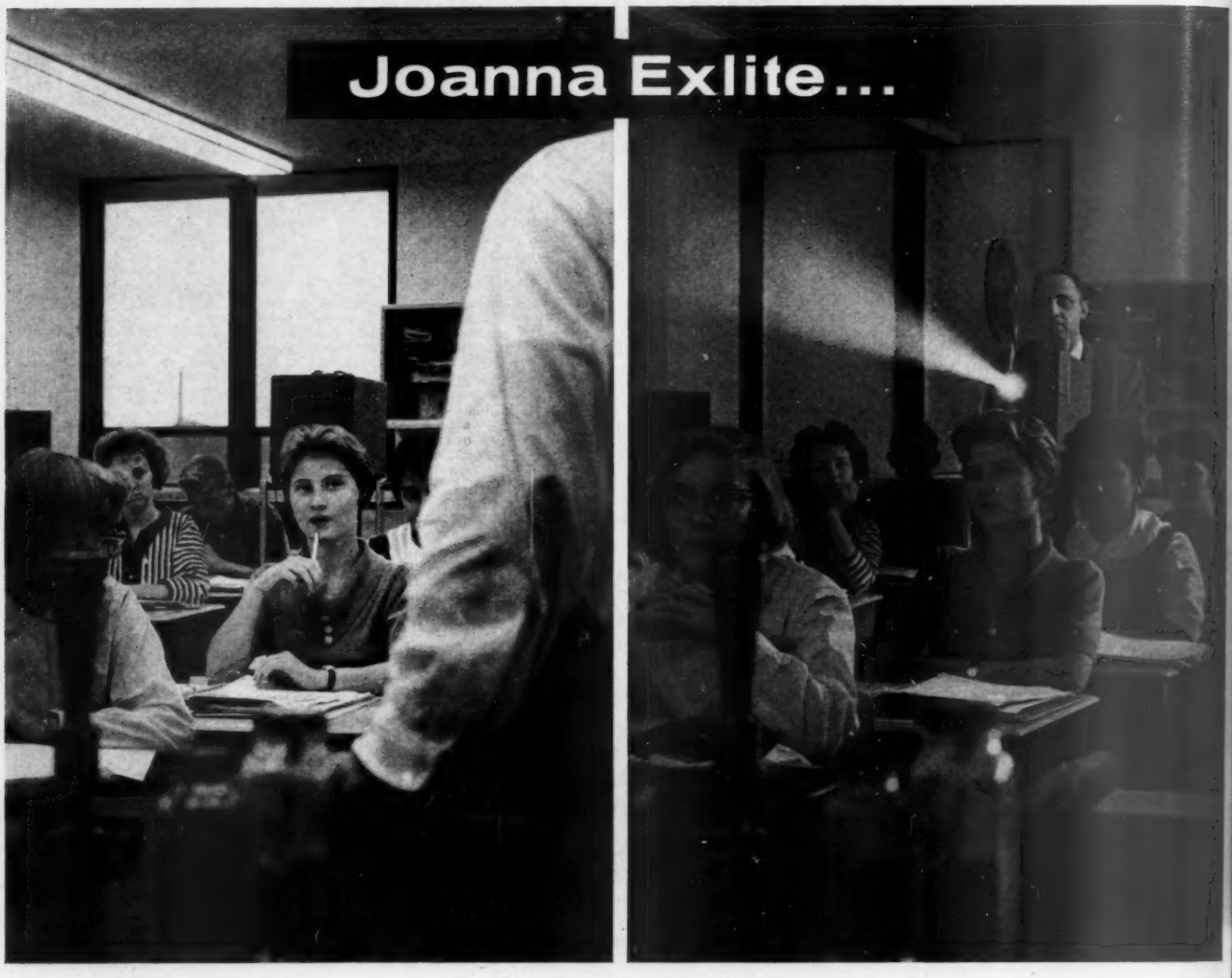
Similar to the No. 2 Shade. Operated by a continuous cord and two lock pulleys. Sometimes recommended when other shades would be difficult to install due to type of window construction, etc.

Forse Shades and Drapes are available for purchase under the National Defense Education Act

JOANNA WESTERN MILLS CO.

World's largest manufacturer of window shade products

22nd and Jefferson Streets, Chicago 16, Illinois



the Ideal Room-darkening Window Shade

Exlite Shades by Joanna Western are decorative as well as functional for any room needing light exclusion such as classrooms where slides, movies or films have to be shown, dormitory bedrooms, offices where glaring sunlight hinders work. Unlike old-fashioned shadow-proof shades, Exlite comes in popular light tones that enhance the beauty of modern school construction.

The initial cost of Exlite Shades is far less than other types of room-darkening window coverings. And because of their vinyl coating, they are completely washable for easy, inexpensive maintenance.

No matter what light control your various campus buildings require, Joanna Western makes a specialized product to fit your needs.

EXLITE is washable and flame resistant. Comes in 5 colors, widths to 77 inches. Exlite is just one of many window shade and louvered shutter and door products made by Joanna Western.

For complete information write to:

JOANNA WESTERN MILLS CO.
22nd and Jefferson Streets
Chicago 16, Illinois

higan State University's College of Education Building was completed December, 1958. Construction cost, $18.52 per sq. ft. Windows are glazed with *Thermopane*® insulating glass with Heat Absorbing Plate in the outer pane. Architects: Ralph R. Calder & Associates, Detroit, Mich.

College enrollment explosion is creating a new style of architecture

LOF GLASS
THE QUALITY MARK TO LOOK FOR

In 1945, Michigan State University had an enrollment of 5,622 students. Today, 21,000. By 1965, the prediction is 30,000. The only fitting description for such growth is *explosion.*

As students continue to seek admission, the problem is: how can the University put up new buildings, almost overnight, that will still be functional and up to date for years to come?

We decided to travel to East Lansing, Michigan, to find out.

Ralph R. Calder, AIA, of Detroit, who designed the new buildings shown in these pages, and the University's supervising architect, Donald Ross, met us. We toured the buildings and asked questions.

The new buildings, like the curricula and teaching methods here, reflect

Library at Michigan State is the fifth largest university library in the nation (in terms of floor space). Capacity: 1,000,000 volumes. Cost: $13.10 per sq. ft. Completed December, 195

the changes since the college was founded in 1855. They provide an up-to-date environment for learning.

Question: How long have you been designing buildings for Michigan State, Mr. Calder?

Mr. Calder: It has been my privilege for a number of years to have planned with President John A. Hannah buildings which reflect his vision for growth and academic achievement.

Question: Why did you break away from the traditional style of architecture seen in so many buildings here?

Mr. Calder: We are establishing new traditions here—tradi-tions which will reflect for tomorrow the philosophy o this University.

Question: And how have you accomplished this?

Mr. Calder: The new tradition is one of efficiency—which means efficiency of space—maximum utilization of the physical plant. Technological development in materials and fabrication has advanced this goal; for example, the use of modular construction with insulated glass and spandrels packed with efficient insulating materials.

Donald Ross, supervising architect; and Ralph R. Calder, Al

Students are comfortable at desks next to *Thermopane* windows in the University Library.

Student Services Building, completed in July, 1958, cost $18.75 per sq. ft. Windows in this building are also glazed with *Thermopane* for heating and (proposed) air-conditioning economies.

Question: Can you be more specific about the use of insulating glass?

Mr. Ross: We wanted large areas of glass because we like an "open world" feeling. We have one of the most attractively landscaped campuses in the country—plantings of more than 3,200 different species of trees, vines and shrubs—naturally we want to enjoy them even when we're inside the buildings. Daylight is free, so why not make use of it to help light our interiors?

With all that glass, we figured insulating glass would pay for itself over the years. It cuts down heat loss through windows in winter, lightens the load on our central heating plant, and reduces heat gain in summer. We hope eventually to air condition these buildings. They're designed for it.

Mr. Calder: I might add that we get more utilization of floor space with insulating glass. In the Library, for example, you'll see students at desks right next to the windows. They're comfortable there because double glazing reduces downdrafts.

Question: How do you control sky glare?

Mr. Ross: We have drapes in the Library and Venetian blinds in the other new buildings. And the outer pane in the double glazing (in south and west elevations) is heat absorbing glass. It not only helps reduce sky glare, but makes the insulating glass even more efficient.

Question: Does all this glass impair the use of visual aids?

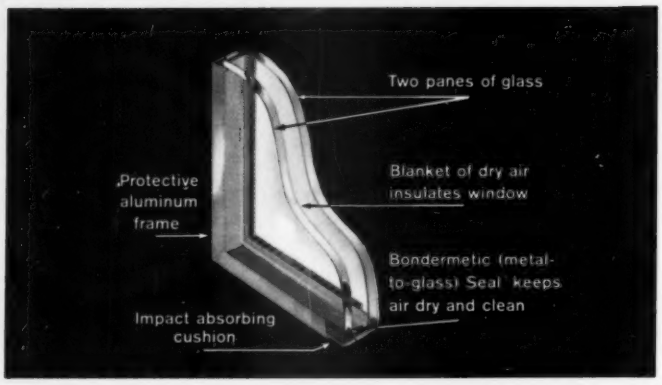
Mr. Ross: Not at all. In fact, all new classrooms are equipped for use of visual aids and closed-circuit television. Blinds and drapes are sufficient to subdue the daylight.

Question: How do the students and faculty like the new buildings?

Mr. Calder: Their enthusiastic use of the buildings demonstrates this.

LOF GLASS

Windows in lounge in Student Services Building overlook older university buildings and a beautifully landscaped campus and gardens.


Two panes of glass
Protective aluminum frame
Blanket of dry air insulates window
Bondermetic (metal-to-glass) Seal keeps air dry and clean
Impact absorbing cushion

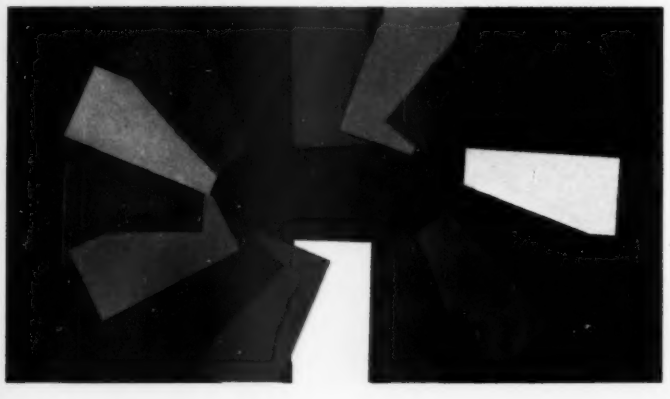
THERMOPANE®—For maximum comfort and for heating and air-conditioning economy, use *Thermopane* insulating glass in windows. Heat loss is cut in half, compared to single glazing. Drafts near windows are reduced. Outside noises are muffled. *Thermopane* is available with either a metal-to-glass *Bondermetic Seal®* and enclosed in an edge-protecting aluminum frame, or with a glass seal. *GlasSeal® Thermopane* is ideal for preglazed sash.

TUF-FLEX®—Tempered plate glass is 3 to 5 times tougher than regular plate glass of the same thickness. Yet it's as clear as any fine plate glass. If maximum resistance is reached, *Tuf-flex* disintegrates into relatively harmless, rock-salt-size particles.

Recommended for gymnasiums, entrance doors and sidelights, areas facing playgrounds . . . any area where students and missiles are in rapid motion.

THREE KINDS OF PLATE GLASS—To achieve clear vision from inside and a richer appearance on the outside, use twin-ground *Parallel-O-Plate®* Glass in windows. For control of sun heat and glare, use *Parallel-O-Grey®* or Heat Absorbing Plate. *Parallel-O-Grey* is neutral grey in color. Heat Absorbing Plate is pale bluish-green. Both effectively reduce transmission of sun heat to keep interiors cooler, but *Parallel-O-Grey* is more effective in reducing glare.

MIRROPANE®—Wherever it is desirable to observe people without their knowledge, *Mirropane*, the "see-thru" mirror, is the answer. On the brighter side it's a mirror that reflects objects in the room. From the darkened observation room, it's a window you can see through but you won't be seen. *Mirropane* can now be made of *Parallel-O-Grey* to provide "see-thru" vision with light differentials as low as 3 to 1 between rooms.



VITROLUX®—Used instead of masonry as an exterior facing material also for interior partitions. Rich color, fused to the back of this clear heat-strengthened plate glass, adds youthful beauty and cheerful character to any structure. It is resistant to weathering, crazing and checking. Standard maximum sizes of *Vitrolux* panels go up to 48″ x 84″. Special orders up to 60″ x 84″. Thickness: ¼″ plus 1/64″ minus 1/32″. Sixteen standard colors, plus black and white. Also in nonstandard colors, subject to manufacturing limitations.

L·O·F GLASS

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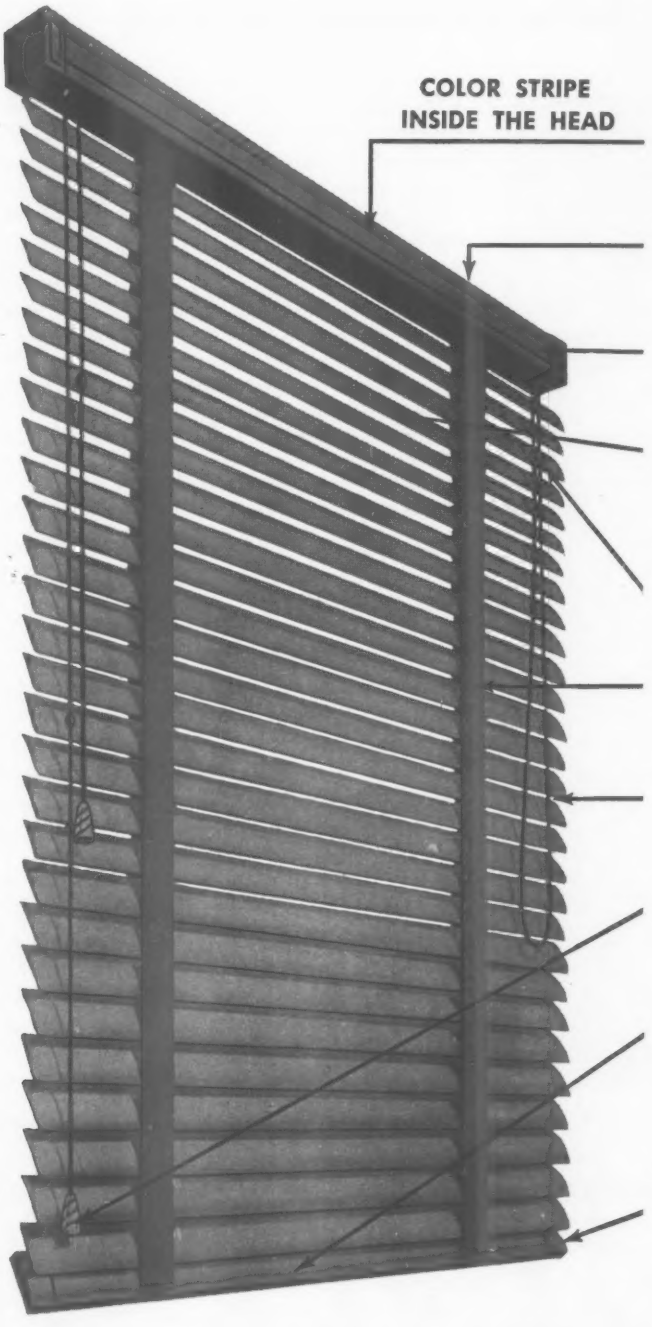
LEVOLOR VENETIAN BLINDS

A-6/LE

FORM No. AS-61



AUDIO-VISUAL BLINDS

•

SKYLIGHT BLINDS

•

DETENTION BLINDS

•

OSCILLATING ROLLERS

•

MECHANICAL LIFTS

•

SPECIFICATIONS

THE LEVOLOR BEST GRADE (Blue Line)

The LEVOLOR Best Grade is better or equal to any other blind on the market with the exception of the LEVOLOR Heavy Duty blind. The LEVOLOR Best Grade is a fine sturdy blind and can be specified with confidence. However, it must be borne in mind that it is not the equal of the Orange Line blind which is a special Heavy Duty blind.

THE LEVOLOR HEAVY DUTY (Orange Line)

The LEVOLOR Heavy Duty blind is not to be confused with conventional venetian blinds. It has been designed for schools, hospitals, hotels and other buildings subjected to hard use. Identified by Orange Stripe in the head.

All genuine LEVOLOR blinds are identified by the medallion cord equalizer and spiral tassels.

LEVOLOR VENETIAN BLINDS FEATURE

1. IDENTIFYING STRIPE—BLUE OR ORANGE INSIDE THE HEAD.
2. PRECISION MADE HARDWARE.
3. HEAVY GAUGE HEAD CHANNEL .025 ON ORANGE LINE.
4. LEVOLOR VIRGIN ALUMINUM ALLOY SLATS.
5. MEDALLION CORD EQUALIZER.
6. LEVOLOR PLASTIC TAPE.
7. LEVOLOR NYLON CORD.
8. SPIRAL DESIGN TASSELS.
9. TRIPLE "U" BOTTOM RAIL.
10. SPIRAL DESIGN END CAPS.

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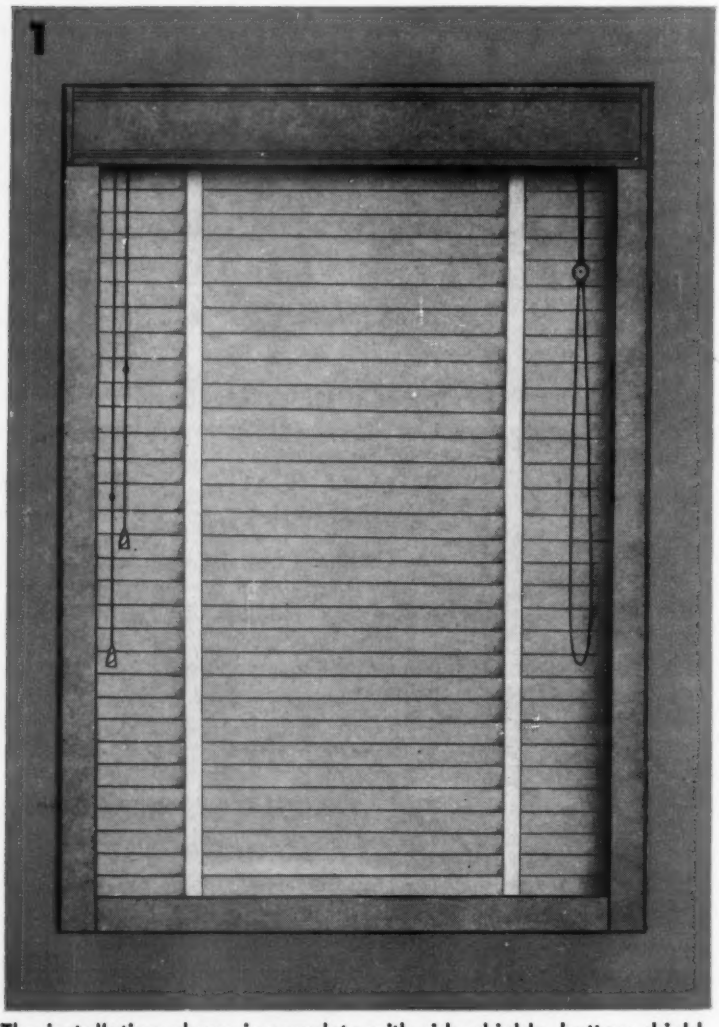
LEVOLOR LORENTZEN, INC., 720 Monroe Street, Hoboken, New Jersey

THE LEVOLOR AUDIO-VISUAL VENETIAN BLIND

GIVES THE EXACT ROOM DARKNESS DESIRED



The installation above is complete with side shields, bottom shield and 7" cornice, also available in a 3½" cornice.

LEVOLOR Audio-Visual venetian blinds can darken any room to suit projector, subject or activity, thus, the old-fashioned auditorium and the confusion and time lost in changing to an auditorium is no longer a problem. There are various methods of installing the LEVOLOR Audio-Visual venetian blind as shown on these two pages.

1. Side and bottom light shields and 7" cornice. With 3½" cornice use head light seal.
1A. Same as above but no bottom light shield and with bottom rail installation like number 2.
2. Side shields and head light seal
3. Head light seal only.

The LEVOLOR Audio-Visual blind may also be operated by oscillating roller, mechanical lift or by motor.

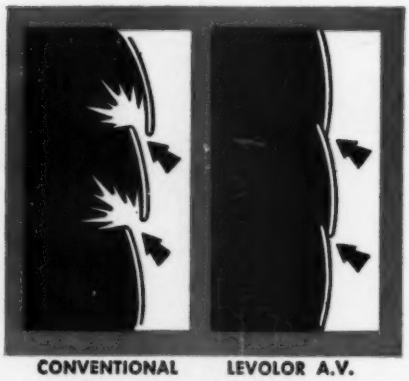
THE VARIATIONS IN INSTALLATIONS AND METHOD OF OPERATION SHOULD BE CAREFULLY CONSIDERED WHEN SPECIFYING

THE LEVOLOR SLEEPYHEAD

The LEVOLOR "Sleepyhead," so named for late sleepers, is an ideal economical blind for hotels. It is a tight closure blind that is constructed the same as the LEVOLOR Audio-Visual blind. The spacing between tape ladder rungs in the "Sleepyhead" is 1⅝ inches, which is wider than 1½ inches in the LEVOLOR AUDIO-VISUAL blind.

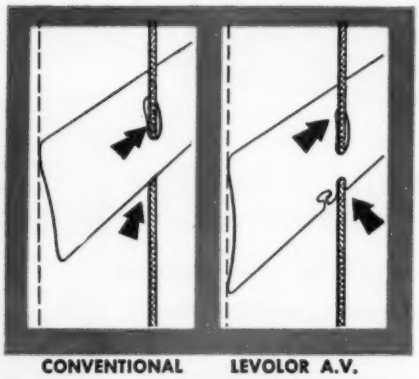
OSCILLATING ROLLER, A.V. BLINDS

When a blind exceeds the size of normal lifting power, the oscillating roller is employed. A metal head light seal and light shields give maximum darkness. For oscillating roller details see pages 10 and 11.



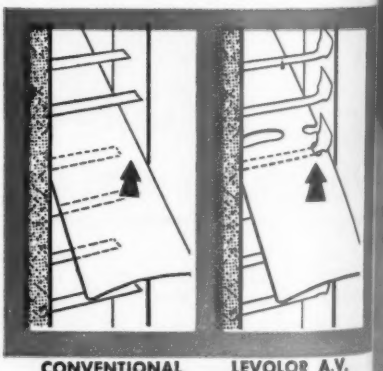
CONVENTIONAL LEVOLOR A.V.

A conventional blind does not close fully while a LEVOLOR A.V. blind has a generous overlap and tight closure to stop light infiltration.



CONVENTIONAL LEVOLOR A.V.

Cord arrangements in the conventional blind stops the slats from overlapping. The off center rout hole and opening in slats allow the LEVOLOR A.V. blind to overlap completely.



CONVENTIONAL LEVOLOR A.V.

Conventional tape ladder rungs are spaced wider apart and the slat lies loosely on the ladder rung. In a LEVOLOR A.V. blind, the tape ladder rung is T shaped and locks into the opening in the slat for proper lift and full closure.

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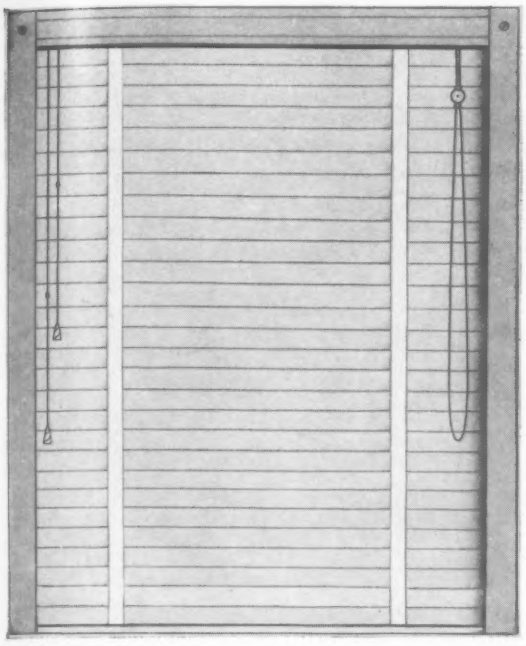
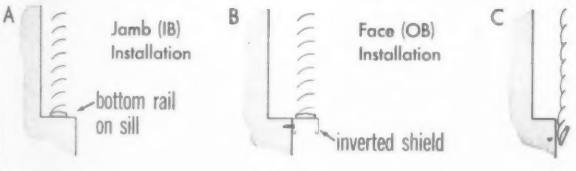
SIDE SHIELDS AND HEAD LIGHT SEAL

2

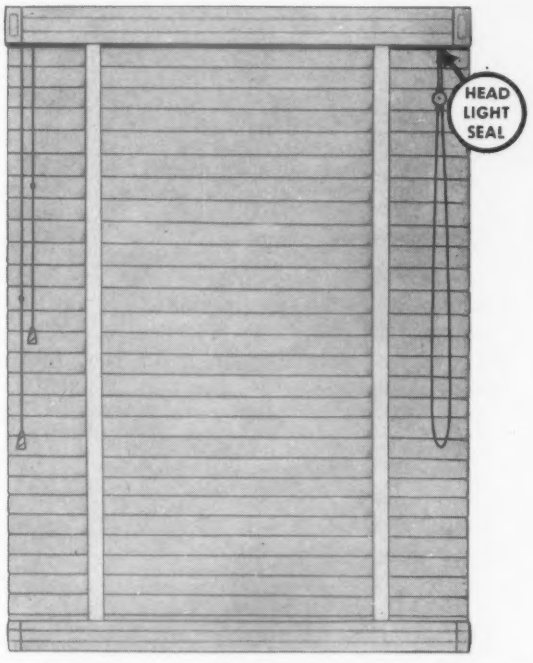


In this installation no cornice is used but a light seal is necessary. The Venetian Blind head is installed between the side shields. Bottom rail installations shown below are "A" IB with bottom rail which does not tilt resting on the sill. "B" the same condition for O.B. installation with bottom rail resting on inverted light shield and "C", O.B. installation with blind hanging far enough below sill to exclude light leakage. See installation details below.



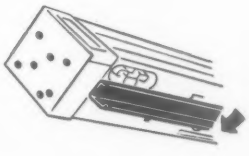
WITH HEAD LIGHT SEAL ONLY

3

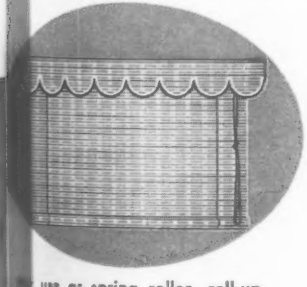


This installation will not give a zero foot candle reading under sunny conditions. However, for most projectors it can do a good economical job.

The head light seal is attached to the head channel to stop light infiltration and MUST BE SPECIFIED WHEN NO CORNICE IS USED.



The head light seal is attached directly to the head channel to stop light infiltration. When no cornice is used light seals must be specified.



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des and draperies.

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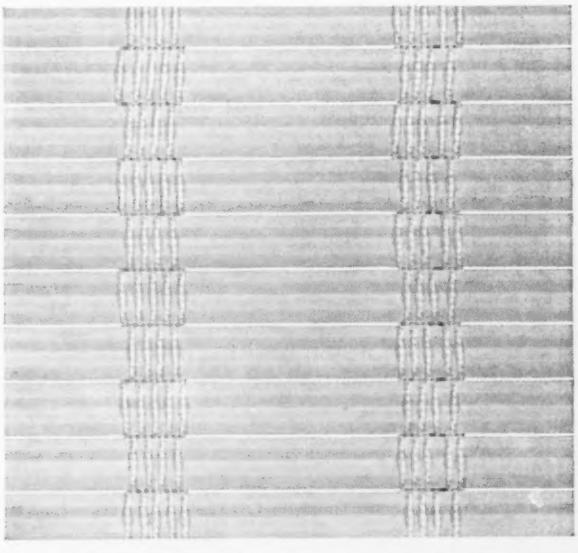
EVOLOR Woven Aluminum is made from slender (¼") wide reeds of luminum, .011 inches thick, rolled to special form and painted both ides. It is interwoven with either nylon, gold or wool as the pattern alls for. Although it pleats or rolls up like a fabric, it has the desired uality of metal.



Actual size of Levolor Woven Aluminum which is available in two patterns and twenty colors.

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LEVOLOR VENETIAN BLIND SPECIFICATIO

Brief Forms

CONVENTIONAL VENETIAN BLINDS

THE LEVOLOR HEAVY DUTY (Orange Line) VENETIAN BLIND

The Venetian blind shall be the "LEVOLOR" Orange Line Blind. The "LEVOLOR" brand metal head and bottom rail shall be Orange Line .025" thick Tomized (treated for corrosion resistance) steel. Both the head channel and the bottom rail shall be coated with a high baked plastic coating and shall be formed after coating. The bottom rail shall have plastic Spiral design end caps or metal end pieces inserted into each end. All hardware shall be "LEVOLOR" brand Orange Line and shall include the "LEVOLOR" lift cord separator, and solid tilt rod. The slats shall be 2" wide and of "LEVOLOR" brand virgin aluminum. The ladder tapes shall be "LEVOLOR" brand vinyl plastic tape. The two face tapes shall be 1½" wide. Spacing between ladder rungs shall be 1⅜". The cord shall be "LEVOLOR" brand braided nylon with a pull strength of 225 pounds or more before breaking. The lift cord shall have a "LEVOLOR" Medallion plastic equalizer. The tilt cord shall be equipped with "LEVOLOR" Spiral design tassels and cord limit beads. Standard colors to be selected by the architect.

THE LEVOLOR BEST GRADE (Blue Line) VENETIAN BLIND

The Venetian blind shall be the "LEVOLOR" Blue Line Blind. The "LEVOLOR" brand metal head shall be .020" thick and the bottom rail shall be .025" thick Tomized (treated for corrosion resistance) steel. Both the head channel and the bottom rail shall be coated with a high baked plastic coating and shall be formed after coating. The bottom rail shall have plastic Spiral design end caps or metal end pieces inserted into each end. All hardware shall be "LEVOLOR" brand Blue Line and shall include the "LEVOLOR" lift cord separator. Blinds 72" and over to have solid tilt rod. The slats shall be 2" wide and of "LEVOLOR" brand virgin aluminum. The ladder tapes shall be "LEVOLOR" brand vinyl plastic tape. The two face tapes shall be 1½" wide. Spacing between ladder rungs shall be 1⅜". The cord shall be "LEVOLOR" brand braided nylon with a pull strength of 225 pounds or more before breaking. The lift cord shall have a "LEVOLOR" Medallion plastic equalizer. The tilt cord shall be equipped with "LEVOLOR" Spiral design tassels and cord limit beads. Standard colors to be selected by the architect.

AUDIO-VISUAL VENETIAN BLINDS

THE LEVOLOR HEAVY DUTY (Orange Line) AUDIO VISUAL VENETIAN BLIND

The Venetian blind shall be the "LEVOLOR" Orange Line A. V. Blind. The "LEVOLOR" brand metal head and bottom rail shall be Orange Line .025" thick Tomized (treated for corrosion resistance) steel. Both the head channel and the bottom rail shall be coated with a high baked plastic coating and shall be formed after coating. The bottom rail shall have plastic Spiral design end caps or metal end pieces inserted into each end. All hardware shall be "LEVOLOR" brand Orange Line and shall include the "LEVOLOR" lift cord separator and solid tilt rod. The slats shall be 2" wide and of "LEVOLOR" brand virgin aluminum. The ladder tapes shall be "LEVOLOR" brand vinyl plastic A. V. tape. The two tape faces shall be 1½" wide. Spacing between ladder rungs shall be 1½". The cord shall be "LEVOLOR" brand braided nylon with a pull strength of 225 pounds or more before breaking. The lift cord shall have a "LEVOLOR" Medallion plastic equalizer and shall have a stringing arrangement, as specified in "LEVOLOR" Architects Manual, Fifth Edition. The tilt cord shall be equipped with "LEVOLOR" Spiral design tassels and cord limit beads. Standard colors to be selected by the architect.

NOTE: Head Light Seal, when 7" cornice is not used or a ceiling pocket is less than 5" deep, a plastic ½" angle shall be attached along bottom of head with vertical flange to back and with base 11/16" from front of head and one inch from the ends of the head. This plastic angle head seal shall be attached with screws or rivets at maximum five inch centers so as to be straight and without buckles. When installation is between jambs (IB), a dust cover shall be assembled to top of head channel as light seal.

THE LEVOLOR BEST GRADE (Blue Line) AUDIO VISUAL VENETIAN BLIND

The Venetian blind shall be the "LEVOLOR" Blue Line A. V. Blind. The "LEVOLOR" brand metal head shall be .020" thick and the bottom rail shall be .025" thick Tomized (treated for corrosion resistance) steel. Both the head channel and the bottom rail shall be coated with a high baked plastic coating and shall be formed after coating. The bottom rail shall have plastic Spiral design end caps or metal end pieces inserted into each end. All hardware shall be "LEVOLOR" brand Blue Line and shall include the "LEVOLOR" lift cord separator. Blinds 72" and over to have solid tilt rod. The slats shall be 2" wide and of "LEVOLOR" brand virgin aluminum. The ladder tapes shall be "LEVOLOR" brand vinyl plastic A. V. tape. The two tape faces shall be 1½" wide. Spacing between ladder rungs shall be 1½". The cords shall be "LEVOLOR" brand braided nylon with a pull strength of 225 pounds or more before breaking. The lift cord shall have a "LEVOLOR" Medallion plastic equalizer and shall have a stringing arrangement as specified in "LEVOLOR" Architects Manual, Fifth Edition. The tilt cord shall be equipped with "LEVOLOR" Spiral design tassels and cord limit beads. Standard colors to be selected by the architect.

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NOTE: Add the following paragraph to all specifications above.

WORKMANSHIP All workmanship and procedures shall be in accordance with the standards set forth in the "Architects Manual for Venetian Blinds," Fifth Edition, by Levolor Lorentzen, Inc.

LINEN FRESH SPECIFICATIONS can be substituted for any ORANGE LINE specifications above by changing ORANGE LINE (Except for Hardware) to LINEN FRESH BRAND, wherever ORANGE LINE OCCURS.

FOR DETAIL FORMS OR ANY OF THE ABOVE SPECIFICATIONS WRITE DEPT. OF ARCHITECTURAL AND CONSTRUCTION INFORMATION, LEVOLOR LORENTZEN, INC., 720 Monroe Street, Hoboken, New Jersey

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EDITORIAL

Carpeting for Educational Buildings	B 1

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Carpeting for Educational Buildings

by Erwin M. von Fromm

Product Information Director, American Carpet Institute, NYC

Mr. von Fromm has a B.S. degree from Tufts College and an M.A. from Dartmouth. He has also served the American Carpet Institute as sales training director.

CARPETING OFFERS MAJOR advantages as a building material for the nation's schools and colleges. Controlled studies of carpets installed in an upstate New York high school and in a primary school in Andrews, Texas, have revealed that, under severe use conditions, carpeted areas are substantially easier and cheaper to maintain and present better sound conditioning than bare floors.

However, the use of carpeting in schools is not confined to experimental studies alone. Carpets have been installed with success in such school rooms as kindergartens and libraries. Colleges and universities across the country have used carpeting for years. But here, until recently, its application was limited to student unions, lounge areas and executive offices.

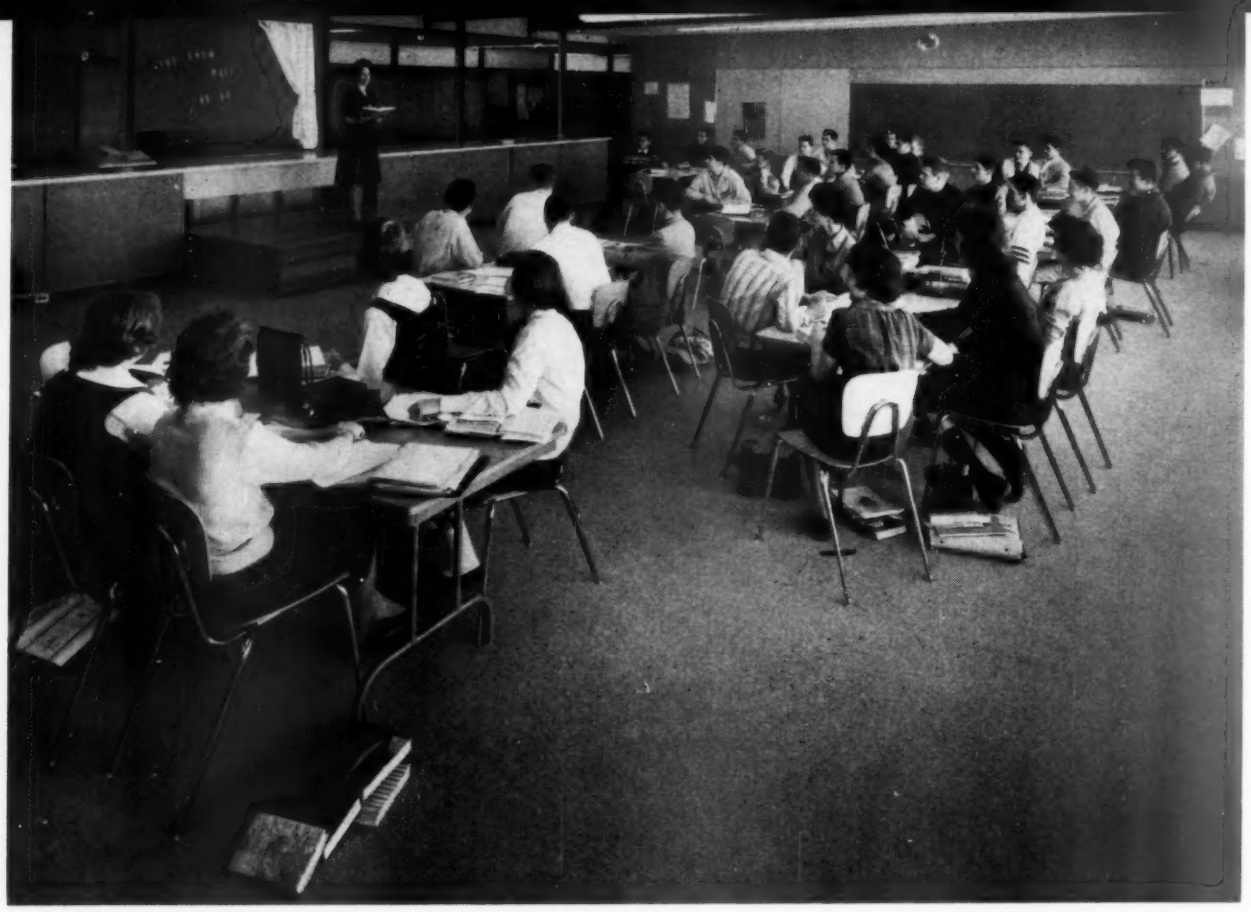
The developing use of carpeting is being watched closely by Ford Foundation's Educational Facilities Laboratories, Inc., as it studies ways to improve the efficiency of education through new school designs. In its recent report on educational television the organization noted that carpeting as an "acoustical floor" could possibly solve many acoustic problems in a school, particularly those created by expanded applications of noise-producing equipment.

Shaker High Experiment

The research conducted at Shaker High School near Newtonville, N. Y., which opened in 1958, determined the practical advantages of carpet in a school use situation. The American Carpet Institute arranged to have 25,000 square feet of commercial grade carpets installed in classrooms, corridors, offices, libraries and study room areas of the senior high school section of the school. Serving as control for the study was the identical junior high school section where the asphalt tile flooring was not carpeted.

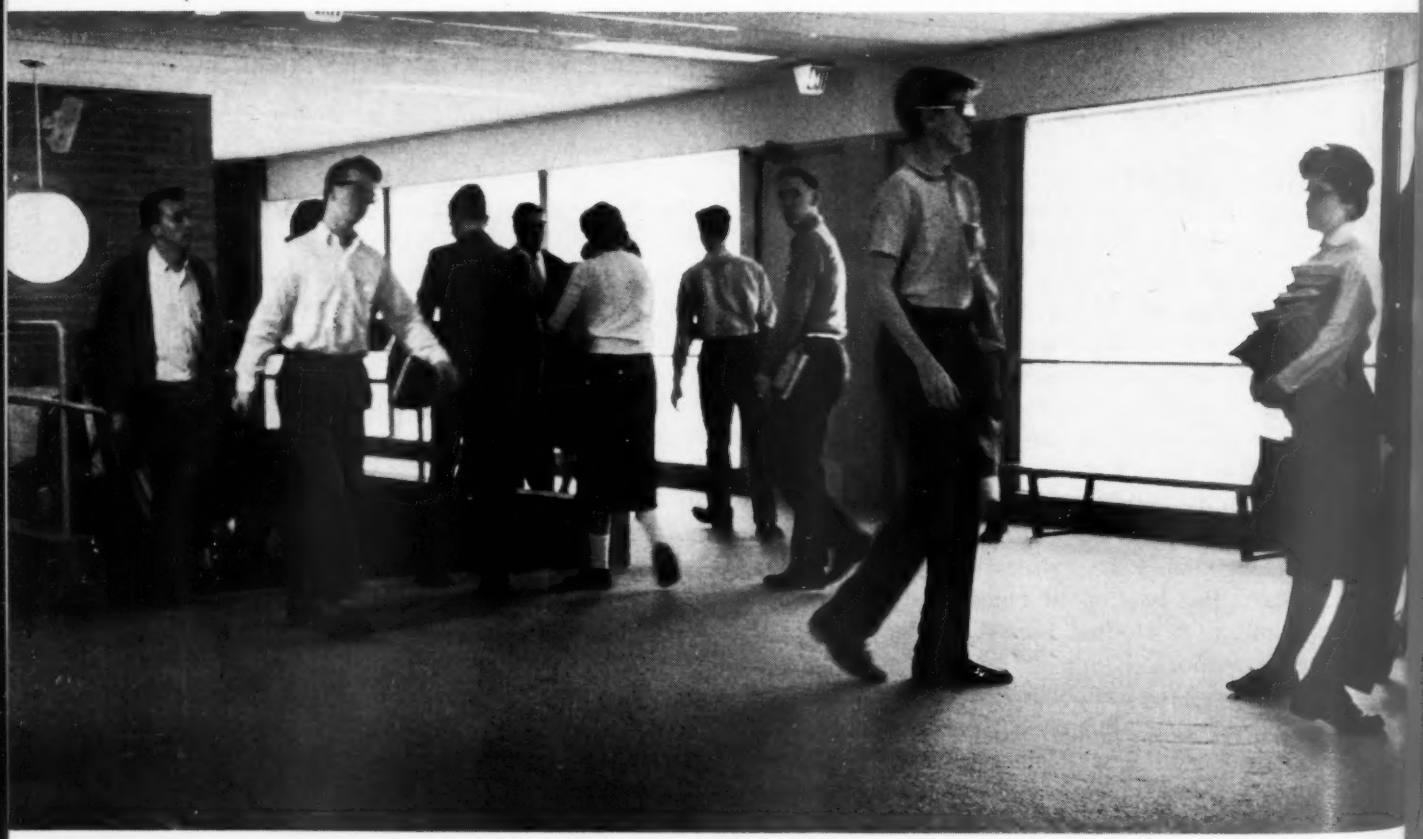
A study of maintenance aspects was under the supervision of Industrial Sanitation Counselors, a nationally-known firm which acts as housekeeper for corporations, hotels and institutions across the country. Acoustical effects were studied by Harry E. Rodman, Professor of Architecture, and Carl J. Kunz, Jr., Assistant Professor of Electrical Engineering, both of Rensselaer Polytechnic Institute, Troy, N. Y.

The maintenance study was conducted from January 5 to June 5 of the first school year. Industrial



General education laboratory at Shaker High School opens onto the corridor. Noise of students in corridor barely penetrates into the room and class activities do not disturb other groups further down the hall. Architect of the school is Henry L. Blatner.

An estimated 600 students walk through carpeted hallways at every class change. Corridor carpeting shows no wear except at top of staircase where students pivot.



Sanitation Counselors set up maintenance time records and supply and equipment cost records which were kept by the school custodial staff. ISC's findings revealed that the daily average time required for cleaning 1,000 square feet of carpeted area in the school was 34 minutes as against 64.5 minutes for a similar space with asphalt floor tile—a time-labor savings of 47 percent.

Cost comparisons showed that the total annual cost per 1,000 square feet of carpeted area was $176.61 versus $350.75 for the same area with asphalt tile. This represents a savings with carpet of 50.4 percent or about half of the non-carpeted maintenance cost.

Carpeted areas were vacuumed daily with a commercial wand type cleaner and given a weekly vacuuming with a beater bar cleaner. At the end of the first school year, it was agreed that the carpet did not need a thorough on-location cleaning, and this would be necessary only once every two years. In August, 1960, prior to the start of the fall school term, all of the carpets were thoroughly cleaned on location by a variety of dry cleaning methods and with effective results. The cost of this cleaning, however, was included in the daily average cost for the maintenance study.

Another cost factor considered was the time and labor involved in spot removal, which averaged 15 minutes daily for the school custodial staff in the carpeted areas. For the uncarpeted areas, the schedule required daily dust mopping, monthly buffing and stripping and waxing twice a year.

To evaluate the comparative maintenance time-cost data, Industrial Sanitation Counselors established a point rating system for the cleanliness level of a given area. By this rating system, 100 is considered perfection or original appearance. At the end of the school year the carpeted areas were judged to have a quality appearance level of 92 as compared to 65 for the other flooring. In its report ISC noted that, if the non-carpeted areas of the school were maintained at approximately the same appearance level of the carpet, the difference in time and cost would have been much greater.

Acoustical Research

The acoustical research revealed several important facts:

1. Under actual school use conditions, the performance of the carpet in reducing sound approximated closely the findings of a previous study conducted by Dr. Cyril Harris at Columbia University's Acoustical Laboratory in 1955. Both studies indicated that carpet can cut noise in a room by as much as 50 percent.

Quiet atmosphere of special areas is greatly aided by carpeting.

Carpeted corridor alcove is often used for special group activities.

2. Sound level readings in the corridors of the school showed that carpet's ability to absorb the noise of impact sounds—footfalls and feet scuffling —substantially lowers the total noise level during class changes. Readings of the noise level in carpeted corridors were 16 to 22 decibels lower than in uncarpeted areas.

3. There are indications that the sound absorption material required to reduce distracting noises in a classroom is better located on the floor than the ceiling. A hard, reflective ceiling can be more effective in transmitting speech by a teacher to her class than a sound absorbent ceiling of porous acoustical materials.

The acoustical research included measurements of the reverberation time of sounds transmitted by scientifically placed loudspeakers, and by sound level readings.

Besides the maintenance and acoustical studies, reports were also given on the psychological effect of the carpet on the students and teachers at Shaker High School. Principal Millard J. Smith noted that "there is a unanimous feeling on the part of the staff that they would prefer to teach in carpeted rooms." He stated that the staff finds the carpeted rooms less "institutional" and that a close relationship between the student and teacher is easier to develop.

Also, he reported, "The presence of carpet has been observed by all of our faculty as a major cause of positive habit development by students using these areas. Boys wearing hats as they enter the building immediately remove them upon feeling the carpet under foot. Loud talking and horse play in the corridor has been seen to cease when the group reaches the carpeted area."

Mr. Smith added, "Some teachers feel that the carpet encourages group activities since the floor —which is an area used by teenagers at home—now becomes an area available to teenagers in school.

Central office area is shared by teachers in each of the four little schools of Shaker High School. Teachers note that carpeted offices add to a relaxed atmosphere during consultations with students.

Commercial vacuum cleaner is used for cleaning carpeted classrooms after school. Tank is left outside rooms and flexible hose and wand permit cleaning of a wide area.

With the carpet, no one is the least bit opposed to sitting or working on the floor regardless of the clothing which might be worn."

Andrews Experiment

Five years ago the Andrews Independent School District of Andrews, Texas, conducted its own experiment with the use of carpet in a primary school. The "Peter Pan" unit was selected, with four other identical school units serving as control. At the end of 27 months, all maintenance costs, including equipment for the Peter Pan unit, amounted to $1,457.94. The maintenance costs, including equipment, for the other units ranged from $2,087 to $2,099.

Estimating the wear life of the carpet as a minimum of nine years, the school authorities determined that, by the end of this period, the school would be able to save over $1,200 in maintenance costs as compared to upkeep expenses for the non-carpeted primary units. They noted that the full saving offered by carpeting was not wholly revealed because upkeep costs for the Peter Pan unit also included the cleaning and waxing of ceramic tile flooring.

In addition, custodial officials at the school found that maintenance requirements on furniture were higher in non-carpeted classrooms because the hard floors caused much damage to falling chairs and other items. This damage was not noted in the carpeted unit.

Teachers and caretakers had initial misgivings about the carpet. They felt it would be harder to care for and would restrain the children from free

Students naturally resort to sitting on carpeted floor.

Carpeting installed in the language laboratory absorbs most of the atmospheric noises that might disturb students as they work with special equipment.

Martin Helfer Photos

activities. Experience proved these fears unfounded. The custodians discovered they could vacuum the carpet faster than they could wet mop hard floors. Teachers observe that the carpet reduces noise and the quieter atmosphere helps youngsters in their attitudes and behavior. The carpet even extends the instructional area by turning the floor into a work space where children can sit during handcraft activities.

Frank Hyde, director of school properties for the Andrews School District, relates: "We readily admit that we were skeptical at first and imagined many disadvantages in using carpet on a classroom floor. Yet, as of this date, we have not experienced any disadvantage that would warrant removal of the carpet or influence us against the use of carpet in other classrooms."

It was this experience and the Shaker High experiment that persuaded the Andrews school board to call for bids on carpeting for classroom and corridor areas of the new senior high school to be built in the district. The architects discovered that they could carpet the school for a cost equal to a hard floor surface and an acoustic tile ceiling. As a result, the bid was approved and carpet will be the major flooring material in the new building.

Carpeting has also been installed recently in classroom areas at the University of Chicago High School in Illinois. School boards and architects are expressing continuing interest in the development of carpet as a basic flooring material for schools.

Educators recognize that the connotation of carpet as a luxury material at first may create resistance by school boards and other groups to its use. However, as Educational Facilities Laboratories noted, establishment of the practicality and economies implicit through the use of carpet may well require a change in attitude toward the product.

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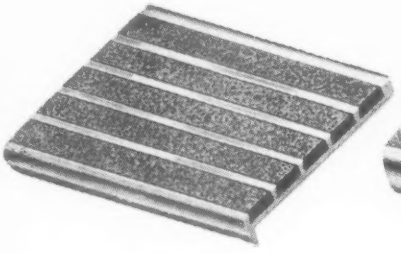
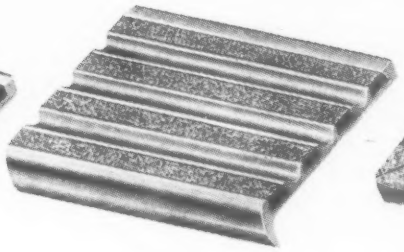
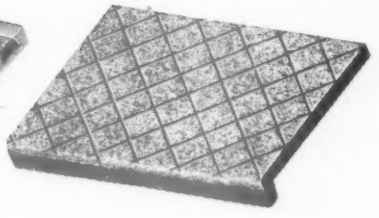


Masonco Type
Aluminum Abrasive Filled



Ribbed Type
Aluminum or Arch. Bronze—Abrasive or Lead Filled

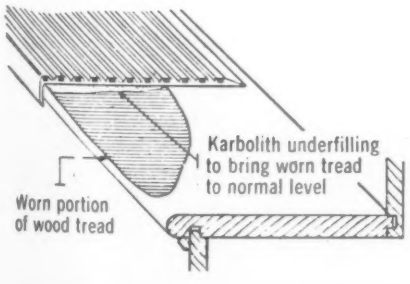


Abrasive Metal Type
Iron, Aluminum or Bronze

Also Universal and Anti-Slip Types (not illustrated)

For Stairways, Stair Landings, Ramps, and Thresholds

Extensive experience and pains-taking attention to details is our policy in the manufacture of MASON PRODUCTS.
Continuous development and research enable us to produce many types and sizes of Safety Treads to meet all ordinary and many extraordinary situations.



Mason Repair Methods, using any of the above types of Safety Tread, are practical for renewing worn stairs, no matter what the construction. Detail, showing tread cutaway with ribbed type safety tread repair.
Installation covers up unsightly front edge and is quickly and easily installed.

Write for copy of Mason Catalog, sent free on request to any school official or architect.

AMERICAN ABRASIVE METALS CO.

Irvington 11, N. J. Area Code 201 ES 3-7060 Offices in Principal Cities

MAINTENANCE FREE NON SLIP PRODUCTS FOR STAIRWAYS AND FLOORS

For heavy traffic stairways

ALUMALUN® Safety Stair Treads

Safe at every step

This photo illustrates a typical school stairway installation. ALUMALUN Safety Stair Treads have been used in over 4,000 schools throughout the United States. Installations made as far back as 42 years ago are still in service and still provide safety underfoot.

ALUMALUN Safety Stair Treads *were selected for the following reasons:*

- **Maintenance free**
- **Positive safety against slipping**
- **Lifetime installation**
- **Light in weight**
- **Bright in color**
- **Best safety tread available for installation on worn slate, wood, concrete or terrazzo steps**

American Abrasive Metals Co., originators of the abrasive metal safety stair tread, has given 50 years of faithful service to the building industry. We designed and produced the first cast abrasive metal safety tread over a half century ago. From this pioneering beginning, we have continuously experimented and improved on our first product. Today, the experience and knowledge acquired during the past 50 years has resulted in what we believe to be the finest abrasive metal safety tread that can be purchased. From every standpoint; safety, durability, economy and appearance, AMERICAN abrasive metal castings cannot be equaled.

For light traffic stairways ALTRED® Safety Stair Treads

Now available in color

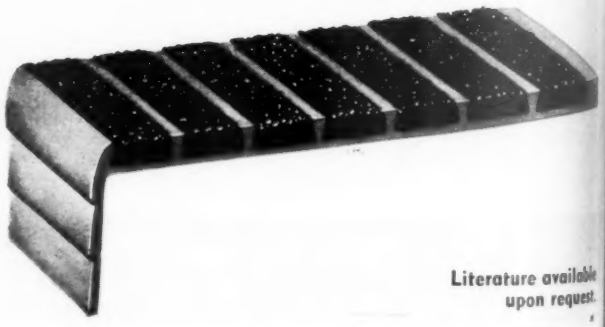
This new feature of the abrasive filler in *color,* on natural aluminum base of slipper satin finish, makes these treads completely modern. *For the first time* there is now available a functional stair tread—safe and long wearing —yet made to harmonize with the overall decor.

By use of ALTRED safety stair treads—colors may be chosen to match the various stairway components, such as vinyl or similar tile, terrazzo finishes, etc.

COLOR—Abrasive filler available in six colors: black, red, green, brown, gray, tan.

LENGTHS—to size. Maximum length in one piece 12'-0".

WIDTHS—1⅞" wide to 9" wide.



Literature available upon request.

AB 186

Trowel On FERROX® *for Safety*

NON SLIP • LOW COST • LONG LASTING

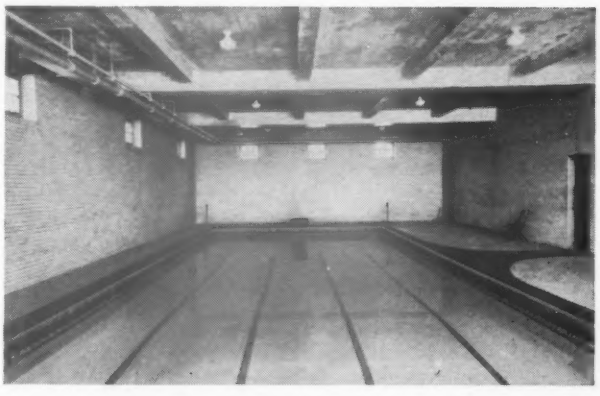
EXCELLENT FOR DANGER AREAS

Ferrox is a plastic, non-slip compound that makes indoor or outdoor walkways safe regardless of whether they're slippery, wet, or oily. It's easy to apply, goes on with a trowel, dries in 6 to 8 hours. One gallon of Ferrox covers approximately 35 sq. ft., thickness about 1/32". It comes in red, gray, black and green.

Ferrox has given years of service in hundreds of schools. It may be applied over concrete, wood, stone, metal or practically any other surface. A few of the many school applications are pictured here. Others include building entrance ways, dressing areas, and auditorium aisles.

Ferrox eliminates cumbersome mats. Being only 1/32" high, there is no trip hazard in approaching the apron. We welcome inquiries on your slip and fall problems.

Ferrox on steep ramp



Just one of many Ferrox applications around a pool

Typical Ferrox application in a shower area

Ferrox for safe footing near machines

Ferrox used as safety mat in industrial arts shop

THE R. C. MUSSON RUBBER CO.

1312 E. Archwood, Akron 6, Ohio

MUSSON'S SAFETY DESIGN MATS and TREADS

FOR BETTER APPEARANCE, ECONOMY, SAFETY AND EFFICIENCY

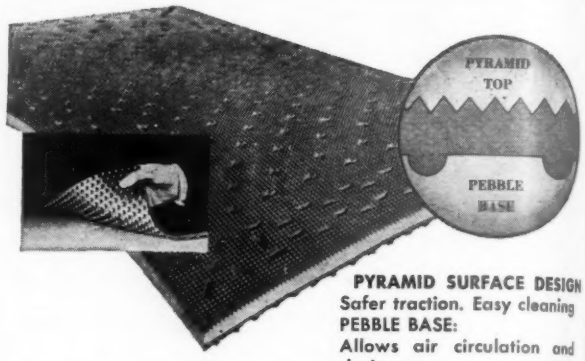
MUSSON PERFORATED RUBBER MATS

ENTRANCE AND LOBBY MATS FOR EVERY NEED

Heavy, live rubber; all sizes and shapes, for flat or recessed installations. Designed in fitted sections for easy handling and cleaning. Clover-leaf, hexagon, round or rectangular perforations. Spike heels will not catch.

DIMENSIONS: ⅜" and ½" thicknesses. Up to 6' x 16'6" in one piece. Custom made shapes and sizes.

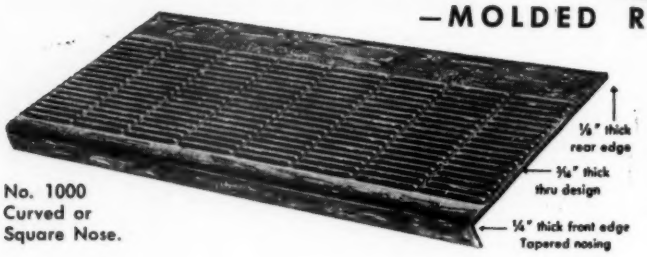
COLORS: Black, Brown Red, Green and Gray.



PYRAMID SURFACE DESIGN
Safer traction. Easy cleaning
PEBBLE BASE:
Allows air circulation and drainage.

HEAVY DUTY STAIR TREADS

—MOLDED RUBBER—



No. 1000
Curved or
Square Nose.

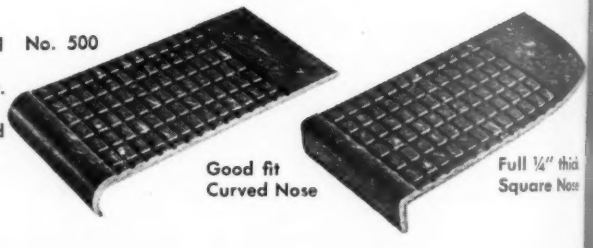
PERFECT FIT MODEL No. 1000 STAIR TREADS

Horizontal bar pattern is modern, safe, easy to clean. Noted for durability in schools and institutions.
DIMENSIONS: 3/16" through design, extra thick at front. Full 12" deep. Stock lengths: 24", 30", 36", 42", 48", 60", 72".
COLORS: Plain Black, marbleized Red, Green, Gray, Mahogany, Beige, Walnut, Black.

MUSSON'S POPULAR No. 500 STAIR TREADS

Heaviest gauge and weight of molded rubber treads available. Recommended for safety, beauty, protection and noise reduction of school stairs.
DIMENSIONS: Full ¼" thick, extra at front. 12½" deep, smooth rear border. Lengths: 24", 30", 36", 42", 48", 54", 61". (72" sq. nose.)
COLORS: Black, or marbleized Red, Green, Gray, Mahogany, Beige, Walnut and Black.

No. 500



Good fit
Curved Nose

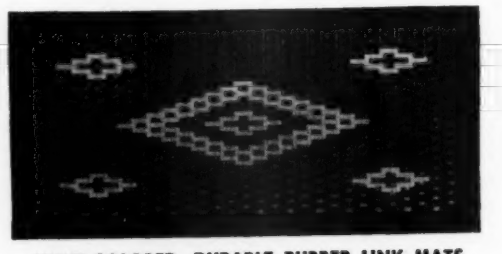
Full ¼" thick
Square Nose

LINK MATS

FLUFF LINK

Chenille-like surface for wiping dust and dirt. Durable. Easy to clean.

COLORS: Red or Green design on Brown field.



MULTI-COLORED, DURABLE RUBBER LINK MATS
Made to specifications. Sizes up to 6'x20', with or without stub or bevelled nosing.

VINYL LINK

Safe for tiniest heels. Remove and hold dirt of foot traffic. Non - skid safety surface.

Nine sparkling colors with matching or contrasting nosing.

WE ALSO SUPPLY SCHOOLS, UNIVERSITIES AND INSTITUTIONS WITH
Runner Matting, Desk Chair Mats, Gym Floor Runners, Shower Mats, Fatigue Mats, Sill Covers

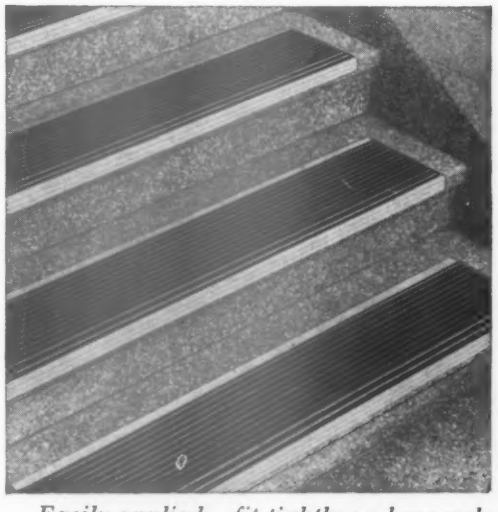
THE R. C. MUSSON RUBBER CO., 1312 E. ARCHWOOD, AKRON 6, OHIO

WOOSTER PRODUCTS INC.
Spruce St., Wooster, Ohio

NEW "TRAFFIC-FLOW" Safety Tread for Schools

REPAIR WORN DANGEROUS STAIRS JUST THIS EASY . . .

SUPER-STAIRMASTER
Aluminum STAIR TREADS



Easily applied – fit tightly and securely over concrete, wood, steel, marble and terrazzo.

AMERICA'S NO. 1 School Tread

Stairmaster Safety Treads are the standard repair and modernization tread for school systems throughout America. The new Super-Stairmaster is unequalled for Safety, Appearance and Durability.

Recommended by Safety Engineers
Guaranteed by Warranty Bond

✔ Detailed literature on the new "Traffic-Flow" Super-Stairmaster and the repair of worn stairs will be gladly sent by return mail. If you are planning new construction ask for copy of Architectural Catalog. WRITE –

WOOSTER PRODUCTS INC.

SCHOOL DEPT. A SPRUCE ST., WOOSTER, OHIO

NATCO CORPORATION

General Offices: 327 5th Ave., Pittsburgh 22, Pa., Telephone GRant 1-9370

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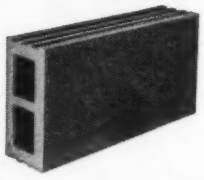
In Canada: Natco Clay Products Ltd. 55 Eglinton Ave. E., Toronto 12, Ont.

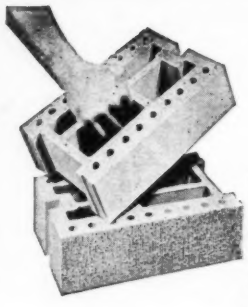
ALWAYS LOOK TO NATCO

for the complete line of structural clay products for quality masonry construction



CERAMIC GLAZED VITRITILE

Furnished in nominal 2", 4", 6" and 8" thicknesses in ceramic color, speckled and clear glaze finishes. Provides permanent interiors with little maintenance. Complete shapes and fittings furnished. Nominal face sizes: "8W" Series 8"x16", "6T" Series 5⅓"x12", "4D" Series 5⅓"x8". Write for shape catalogs.



UNIWALL FACING TILE

Tile Face Size 3⅝" x 11⅝" available in Buff Range Rugg-Tex Exterior Finish - Ceramic Glaze Interior Finish for single unit wall construction. Manufactured from the highest quality fire clay to conform to all A.S.T.M. and Federal specifications for load-bearing facing tile.

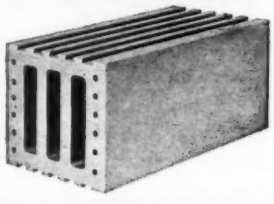
CERAMIC GLAZED NATCOUSTILE

A perforated face unit, designed to supplement our ceramic glazed facing tile in walls and partitions where acoustical sound absorption is of primary importance. This structural clay loadbearing unit is fireproof and easily maintained. Available in the standard ceramic glazed field shades. "8W" Series random pattern, and "6T" Series uniform pattern, furnished in nominal 4" thick stretchers only.

OTHER NATCO CLAY PRODUCTS

- Speed-a-backer Tile
- Speedtile
- Splayed Base Tile
- Bakup Tile
- Segmentile and Silo Tile
- Unglazed Facing Tile
- Ceramic Glaze Vitribrik, "4S" Series
- Tex Dri-Wall Tile
- Patio Tile
- Stairtread Tile
- Dri-Speedwall Tile
- Natcoflor
- Combination Floor Tile
- Clay Flue Lining
- Clay Drain Tile
- Clay Sewer Pipe
- Vitri-Seal Pipe
- Wall Coping Tile
- Clay Stove Liners
- Flashing Tile
- Chemtile
- Kiln Floor Brick
- Natsol Solar Screens

Write for General Catalogs S-61 and SB-61



"FIREPROOFER" TILE

This heavy-duty fire resistant unit is designed for stairway and elevator enclosures, or other areas where a single unit 6-inch wall is required with a 2-hour fire resistance rating. Furnished in a ceramic glazed finish on one face only in a variety of colors. Size: 5¼" high x 11¾" long x 5¾" thick.

FACING BRICK

Manufactured from highest quality clays, Natco facing brick is perfect for interiors and exteriors of modern buildings. Natco Ceramic Glazed Velour and Speckled brick is furnished in many attractive colors. Unglazed facing brick is furnished in red, buff and gray ranges in Standard, Roman and Norman sizes and in various textures.

TORJESEN, INC.

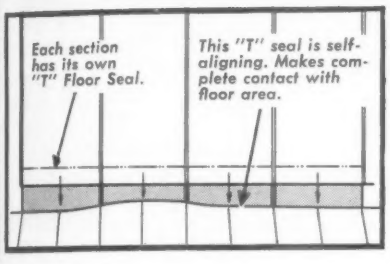
Plant and Executive Offices: 209-25th Street, Brooklyn 32, N. Y.

an outstanding new feature in

TORJESEN FOLDING PARTITIONS

THE INGENIOUS "T" FLOOR SEAL

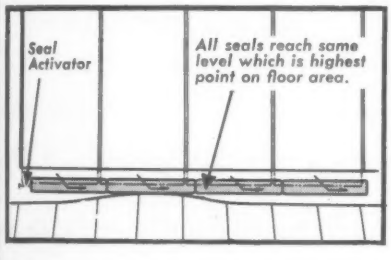
Activated by Compressed Air!



NEW **"T" FLOOR SEAL ON TORJESEN FOLDING PARTITIONS**
Effects 100% Closure Regardless of Floor Contour!

Each section of a Torjesen Partition has its own "T" floor seal. *An electro-pneumatic activated unit in the bottom does the job!* Regardless of high or low floor points, each panel is held rigidly in 100% contact with the floor making the entire partition immovable.

**The new "T" Floor Seal is now standard equipment on all Torjesen Folding Partitions at no extra cost!*



OLD **TYPE FLOOR SEAL NOW IN GENERAL USE *Cannot Effect 100% Closure Unless Entire Floor is Dead Level!***

The drawing at left shows this. When the partition is closed the seal in the first door section is triggered and in turn activates each following door section seal. They all reach the same level which is the highest point on the floor area. Any irregularity in floor contour will cause the rest of the panels to hang loosely thus affecting the rigidity of the entire partition.

---

now available at the same price as Duck or Vinyl

Torjesen "WALL-A-WAY" Folding Partitions with TOROPLY

America's newest, most economical, pre-finished wood paneling, in a choice of rich finishes. In addition to its economy and durability there is no finishing required or necessary. Toroply is impervious to stains such as ink, crayon, lipstick, etc. **Samples and test results on request.**

WRITE FOR FULLY DETAILED CATALOG WITH 3" SCALE DRAWINGS

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Affiliates { **CAPITAL CUBICLE CO., INC.** • *Cubicle and Track*
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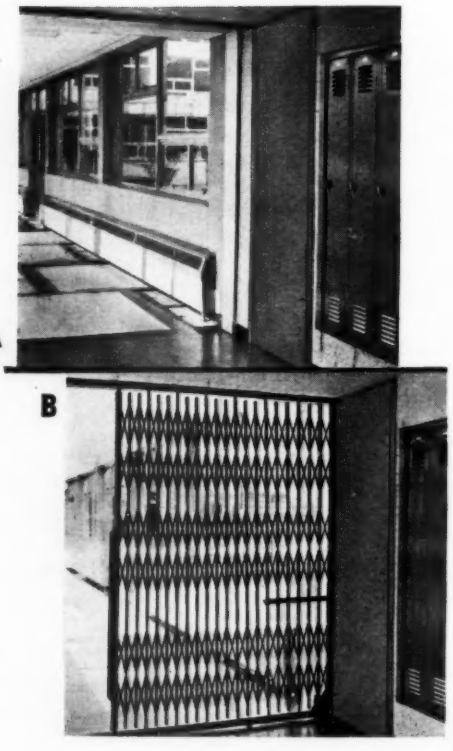
SUPERIOR WIRE & IRON PRODUCTS, INC.

1041 East 76th Street, Chicago 19, Illinois, Phone RAdcliffe 3-3456

Solve your school traffic problem with a Superior collapsible gate, designed specifically for controlling pedestrian traffic.



A

B

- **EASE OF OPERATION**
- **NYLON SELF-LUBRICATING ROLLERS**
- **LOW MAINTENANCE**
- **LASTING APPEARANCE**
- **EASE OF INSTALLATION**
- **CHOICE OF FINISH**

The principle use of Superior collapsible gates in modern school corridors is to direct and control internal traffic during functions in the school, and prevent unauthorized entrance or exit in given areas.

The Superior collapsible corridor gates are available in two models, series #200 and #300, in aluminum or steel and in a choice of finishes and colors to blend with the school motif.

A CLOSED . . . the Superior collapsible corridor gate fits flush into its receptacle presenting a neat appearance and removing any possibility of accident and damage.

B OPEN . . . the Superior collapsible corridor gate presents a neat, attractive traffic barrier.

For existing school buildings, gates can be mounted directly to the corridor wall, or placed in exposed box-type cabinets.

Wire mesh . . .
designed for school use

GYMNASIUM BOX LOCKERS

designed by Superior to reduce locker room congestion and provide safe, neat, permanent storage for students and instructors.

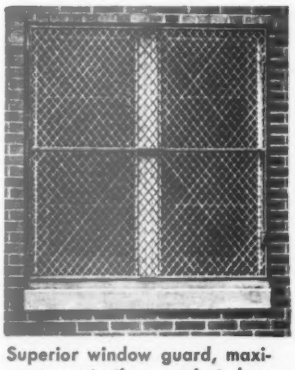
Superior Locker Room facilities constructed of Superior wire mesh partitions.

WIRE MESH APPLICATIONS

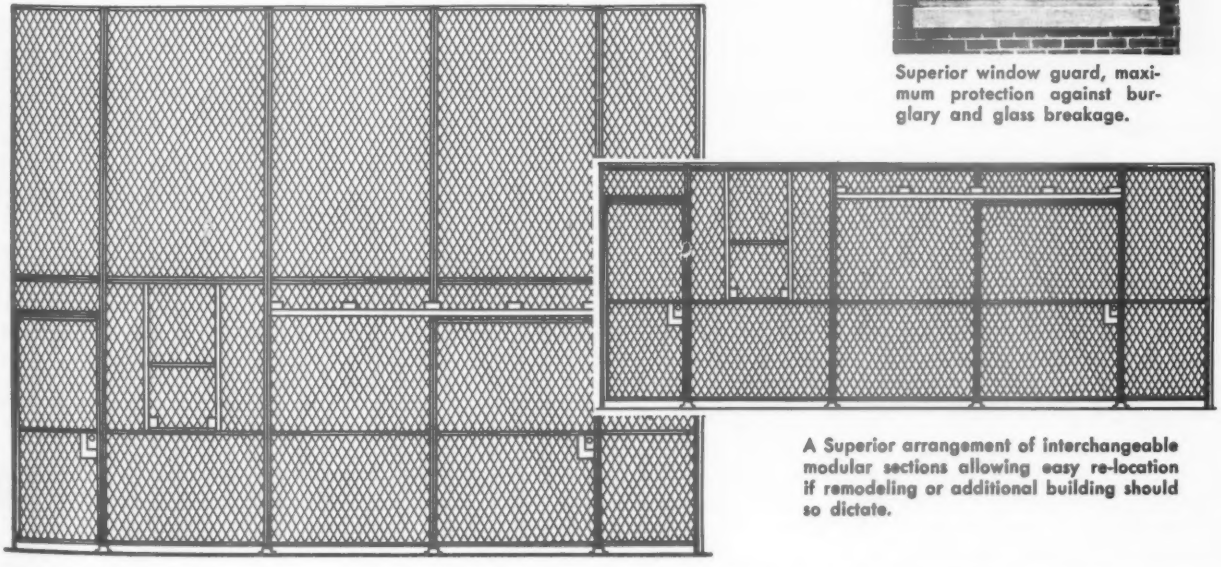
- **for Superior permanent partitions**
- **for window guards**
- **for Superior locker room partitions**

Superior wire mesh partitions provide storage facilities in school shop areas and allow maximum safety and space utilization for servicing swimming pools and gymnasium functions. Such partioning segregates storage areas from pools and gymnasiums yet allows visual contact for supervisory personnel between the two separate areas.

Superior wire mesh is also designed as the most functional and attractive window guard fabricated at low cost as maximum protection against vandalism, burglary and glass breakage.



Superior window guard, maximum protection against burglary and glass breakage.



A Superior arrangement of interchangeable modular sections allowing easy re-location if remodeling or additional building should so dictate.

W. R. AMES COMPANY

SINCE 1910

1001 Dempsey Road, Milpitas, California • Telephone AMherst 2-1000

AMES

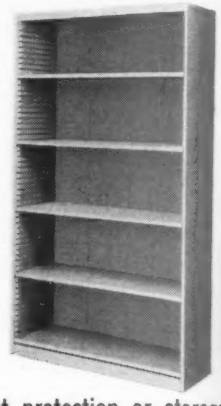
STEEL LIBRARY EQUIPMENT

• COLORFUL • VERSATILE • ECONOMICAL •

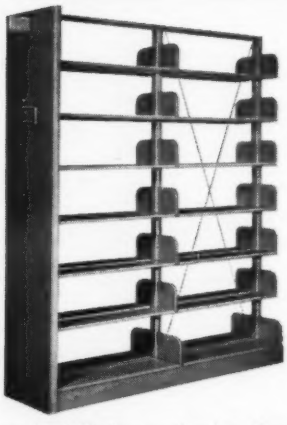
NEW AMESTACK SHELVING

Ames proudly presents the new AMESTACK shelving—a new concept in library equipment. Amestack blends beautifully with contemporary library designs. Amestack is light, open, gives ideal display to books. Strong wire support brackets eliminate the box-like appearance of conventional shelving, lets the books themselves give color to the room. Slender columns and open bases provide that all-important feeling of spaciousness. Available in 4-foot shelf lengths, in standard or custom decorator colors. Tomorrow's shelving—here today!

NEW UNICASE SHELVING



From Ames — the new UNICASE shelving unit, designed for beauty and versatility in today's libraries. Unicase is sturdy, serviceable, of all-steel construction. Optional sliding doors are backed with styrofoam for noise reduction, lock securely for dust protection or storage of valuable books and documents. Three-foot shelves, adjustable on 1″ centers. Base is 4-way reinforced; Unicase can be moved fully-loaded on a hand truck. Unit construction permits arrangement as room dividers with embossed backs providing strength and an attractive design motif.



CONVENTIONAL FREE-STANDING SHELVING

Ames' quality line of Free-standing Steel Shelving combines maximum versatility of shelf arrangement with Ames' functional design. Adaptable to any library floor plan. Unit construction means easy installation and relocation. Existing installations can be quickly expanded. Sturdy frame with enclosed base supports adjustable bracket-type shelving. Ranges available in standard 3-foot units, may be lengthened or shortened as library use demands. Base supports equipped with leveling screws—no need for shims. Available in three standard colors, or in special custom decorator tones.

LOW-COST WALL-HUNG SHELVING

Ames Wall-Hung Shelving is the answer for shelving installations where space is at a premium. Simple, low-cost. System employs slotted steel columns, easily fastened to any wall. Placed at 36″ intervals, column strips support any standard bracket-type shelving. Designed for versatility in display—sloping shelves, coat-racks, lightweight desks, etc.,—Ames Wall-Hung Shelving provides sturdy, adaptable book storage space at less than half the cost of adjustable wood shelving of comparable quality. Easily rearranged, it's ideal for classrooms, small libraries, offices.

AMES EQUIPMENT is widely used in public libraries, schools, colleges, institutions, offices and special libraries. Names of recent Ames installations will be supplied upon request. Our experienced library equipment engineers are happy to help you with your planning, layout and budgeting. Write today.

Since 1910

AMES

W.R.AMES COMPANY

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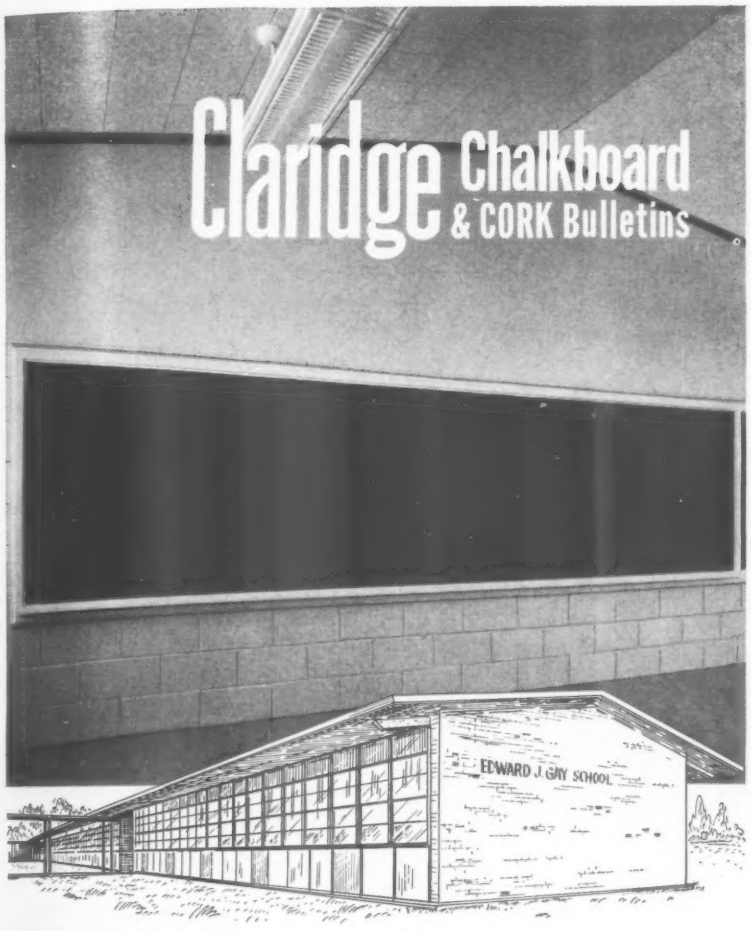
1001 Dempsey Road, Milpitas, Calif.

Representatives in Principal Cities

CLARIDGE PRODUCTS and EQUIPMENT Inc.

Harrison, Arkansas



Edward J. Gay School, Plaquemine, La. Architects: Post Harelson, Baton Rouge, La.

..QUALITY, Permanency

at Low Cost!

CLARIDGE continues to modernize and improve chalkboard and bulletin board manufacturing in step with new educational demands. 36 years experience concentrated on ONE purpose: the FINEST chalkboards and bulletin boards with greatest educational value. Schools and architects around the world name CLARIDGE to define their standard of quality.

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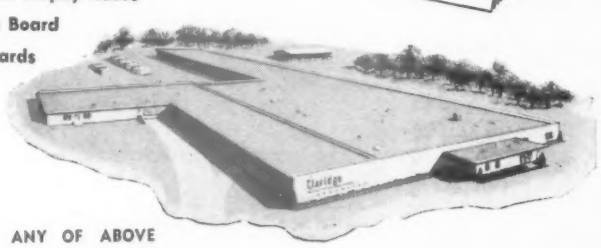
Vitracite Porcelain Enamel Chalkboards — **Extruded Aluminum Display and Trophy Cases**
Durasteel Chalkboards in Seven Colors — **Extruded Aluminum Bulletin Board**
Fabricork Fabric Surface Bulletin Boards — **Claridge Swing Leaf Display Boards**
Extruded Aluminum Chalkboard and Corkboard Trim



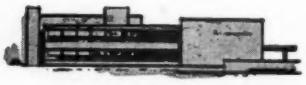
WRITE OR PHONE DEPT. A61 FOR SAMPLES or DATA, PICTURES, PRICES, ON ANY OF ABOVE

PENNSYLVANIA SLATE PRODUCERS GUILD, INC.

Pen Argyl National Bank Building, Pen Argyl, Pennsylvania

A trade association sponsored by the makers of "Pyramid" and "Keystone American" brands of certified natural slate chalkboards.

for the most comfortable *visual environment*

leading schools  *specify*

sufficient lighting *. . . a selective*

color scheme *and*

SLATE CHALKBOARDS

ONLY SLATE

- **Provides Superior Visibility**
- **Writes and Erases Easily—Cleanly, Too**
- **Never Goes "Out of Style," regardless of current color trends**
- **Has Proven Service Life**
- **Saves Custodian Time**

Write for free copies of literature on slate . . . today

SIMPLIFIED SPECIFICATIONS

1. Material: natural slate.

2. Quality and Finish: Finest quality selected natural slate, quarried in Pennsylvania, U.S.A., even in texture, free from ribbons or imperfections that would impair its use or durability as a writing surface. If proof of domestic origin is not available, a certified report must be supplied to prove that the slate supplied has the required hardness, proved service life, low calcite content, freedom from bleaching when in use, and acid resistance equivalent to that of domestic slate of chalkboard quality.

3. Sizes: Chalkboard spaces shall be of the lengths and heights shown on drawings. Modular stock heights are 3′ 0″, 3′ 6″, and 4′ 0″. The contractor shall supply individual boards approximately equal in length in order that the joints be symmetrically spaced. An allowance of ¼″ clearance all around shall be made at trim. Thicknesses shall be maintained between the limits ¼—⅜″.

4. Installation: Chalkboards shall be installed as shown on drawings using manufacturer's recommended installation directions. Joints shall be fitted to provide a continuous writing surface.

. . . and for matchless durability, specify slate Sills, Treads and Risers, Shower Stalls, Toilet Enclosures, Spandrels, Coping, Patios and Walks, Window Sills, Lab Sinks, Tops, Etc.

CORBIN WOOD PRODUCTS DIVISION

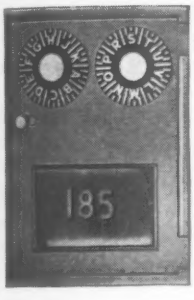
THE AMERICAN HARDWARE CORPORATION

New Britain, Connecticut

For Tops in Styling Security and Convenience

CORBIN

Cast Bronze Letter Boxes



No. 185 Imperial Design — Double Dial Type . . . features bold-faced, easily read dials and positive automatic combination throw-off. Hinges of Imperial Design boxes are flush with face of doors. 3 sizes.

No. 150 Imperial Design — Key Type . . . features crisp, simple lines to complement modern decor. Available in 4 sizes, it can be convenience-keyed so that one key opens entrance door, letter box and interior door.

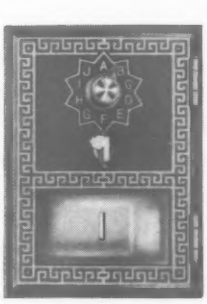
Corbin cast bronze letter boxes offer maximum security, a rich appearance and all-around user convenience. They are furnished in sections completely assembled and ready for use. Construction is of the same sturdy, high-quality materials found in U. S. Government Post Office boxes. Mail can be distributed from the front (through masterdoors) or from the rear through standard pigeonhole arrangement.

Your letter box requirements need not be a problem. Complete plans, elevations and specifications will be furnished by Corbin. For this free service send a rough sketch with dimensions of space available — type, quantity and size of boxes needed. Corbin Wood Products Division, Department E-6, The American Hardware Corporation, New Britain, Connecticut.

Specify CORBIN Letter Boxes Designed for Modern Efficiency

No. 50 Key-Lock Type . . . features Corbin pin-tumbler lock for smooth key action. Can be set to keying system of new buildings for extra convenience. Available in statuary or satin chrome finish, 4 sizes.

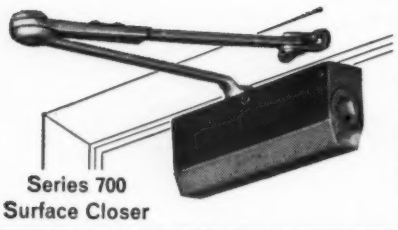
No. P85 Double Dial Type . . . finest quality construction; large, bold-faced, easily read dials; combinations . . . different on each installation. Offers superior security and ease of operation to other dial-operated boxes.



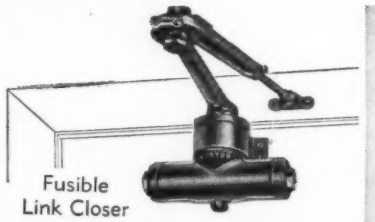
No. 1 Standard Single Dial Type . . . features finely polished fret and other raised surfaces, quality materials. Finished in lusterless brown lacquer or satin chrome. Available in 4 sizes.

NORTON DOOR CLOSERS

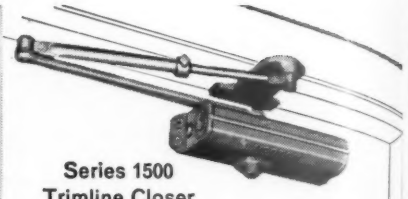
Dept. ASU-61, 372 Meyer Rd., Bensenville, Illinois



Series 700
Surface Closer

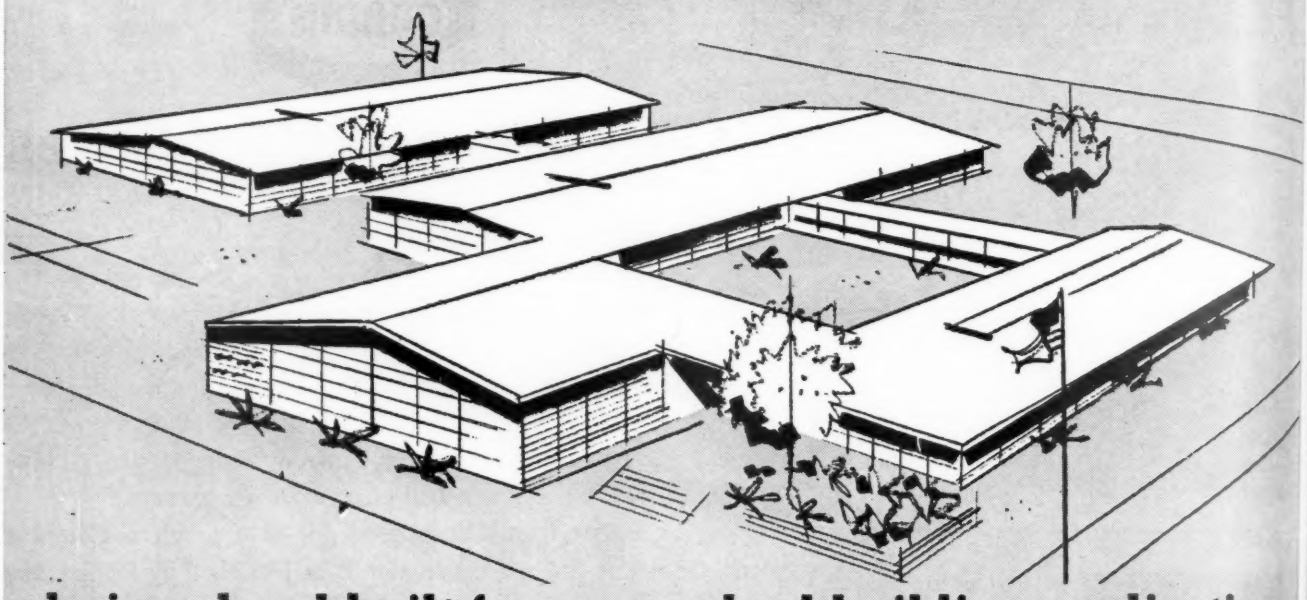


Fusible
Link Closer

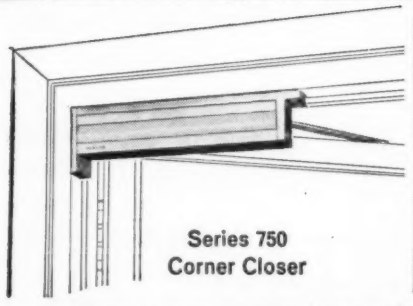


Series 1500
Trimline Closer

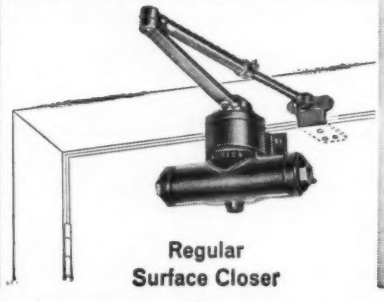
NORTON DOOR CLOSERS...



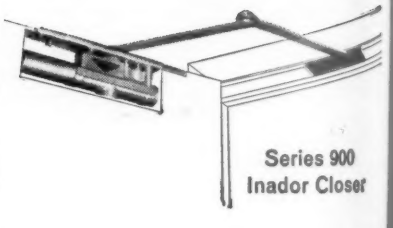
designed and built for every school building application



Series 750
Corner Closer



Regular
Surface Closer



Series 900
Inador Closer

• Regardless of whether you're planning new construction or remodeling, there's a Norton door closer styled and designed for every school door. More than seventy-five years of Norton door-closer engineering and manufacturing experience gives you positive assurance of quality, safety and dependability.

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For complete information write for Manual S.

1008R2

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DOOR CLOSERS
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- BUILDING FACADE LETTERS
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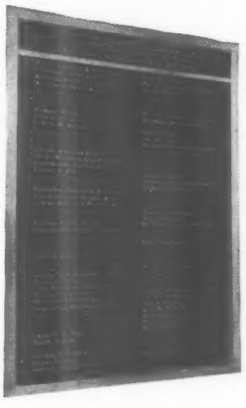
DESCRIPTIVE LITERATURE ON REQUEST

no. 210 Donor Plaque with Removable Nameplates

no. 213 Sculptured Bas Relief Plaque



no. 288 Donor Plaque with Removable Nameplates

no. 222 Award Plaque

no. 261 Bulletin Boards and Directories

ROBERT R. McCORMICK MATERNITY WING
In Memory of COLONEL McCORMICK
1855 - 1955
EDITOR and PUBLISHER
of THE CHICAGO TRIBUNE

no. 236 Engraved Plate

PROMPT 2 WEEK DELIVERY

FINEST IN QUALITY **FIRST IN ECONOMY**

Serving schools and universities throughout the country for more than 30 years, Architectural Bronze and Aluminum plaques and signs are renowned for their master craftsmanship, rich, distinctive finish and life long durability. We will produce your plaque or sign to your specifications—or our experienced design department will submit sketch suggestions for your approval. Simply send us necessary details regarding size, copy, illustrations.

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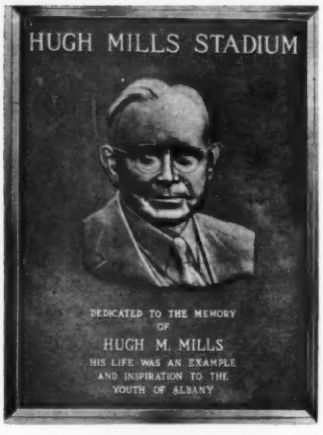
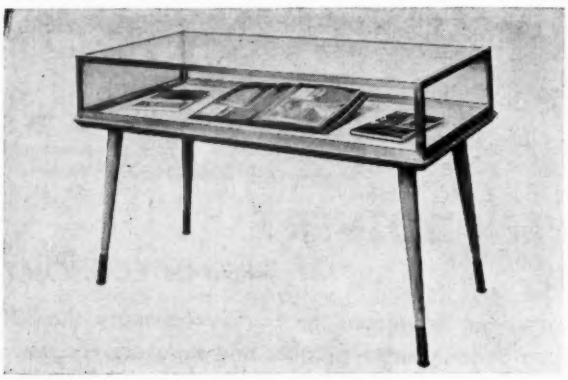


MICHAELS BRONZE AND ALUMINUM PLAQUES

Available in standard designs and sizes, or made to any practical special size or shape. Michaels plaques are skillfully produced of the finest materials, to commemorate construction of buildings, perpetuate the memory of public servants and benefactors, honor veterans and others. Tell us the purpose of your plaque, give wording desired, and the size proposed; and we will be glad to submit sketches and prices. Write for folder illustrating many plaques designed and produced for a wide variety of purposes.

MICHAELS TIME-TIGHT EXHIBIT CASES are custom-made to any specifications and in any type . . . table, aisle, corner, suspended and recessed. Frames of these famous Time-Tight cases are made of extruded bronze or aluminum. Guarding interiors against moisture, dust, vermin, handling and theft, are mitered intersections, Michaels own Innerlocking frames, and other structural features. Because their own simple beauty so greatly enhances contents, Michaels display cases are favorites in every kind of educational institution, museums, art galleries, science laboratories, libraries, etc.

Send for new catalogue giving full information on various types, construction details and interesting pictures of actual installations throughout the country. Avail yourself of Michaels' unusual facilities and many years' experience in designing and producing fine exhibit cases.



MICHAELS NAME PLATES are made of bronze or aluminum, desk plates with or without titles; donor plates, etc.

MI-CO MANUAL PARKING METERS

Faced with the same congestion and monopolization of space that harass city police, many institutions are installing trouble-free MI-CO parking meters. One midwest university won the battle by installing 200 meters; some with two-hour limits taking nickels or dimes; others, six-hour meters taking nickels, dimes or quarters. Control your parking situation, end free all-day occupancy, and earn money doing it. Full details available upon request.

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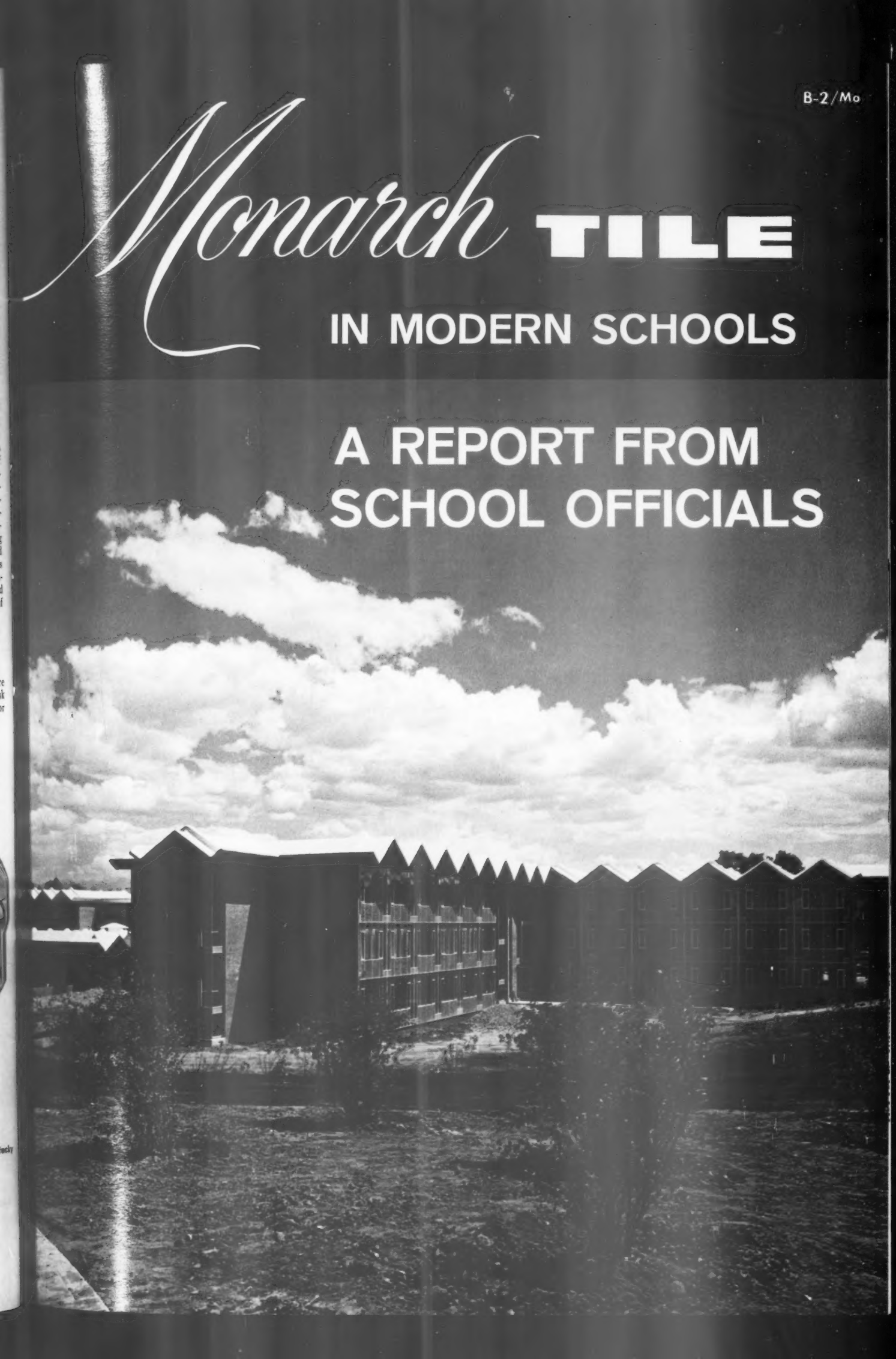
B-2/Mo

Monarch TILE

IN MODERN SCHOOLS

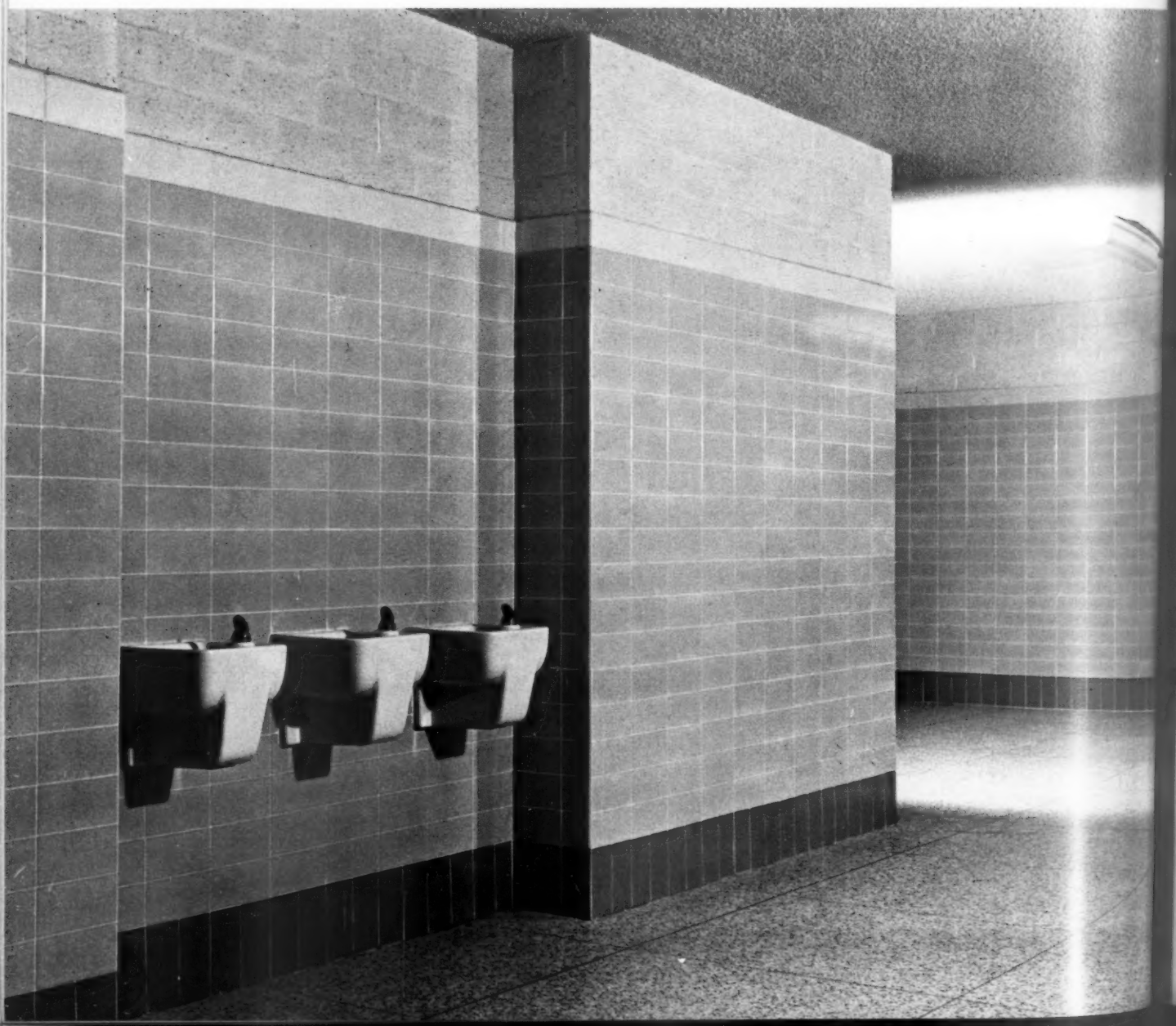
A REPORT FROM SCHOOL OFFICIALS



Monarch GLAZED CERAMIC WALL TILE

Competitive in installation cost . . . . . eliminates costly maintenance

Since installation costs of Monarch glazed ceramic wall tile are now competitive with other wall surfaces, it is being chosen for more schools than ever before. Monarch conducted a survey among school officials and architects to determine the benefits of our wall tile after thorough usage. The reports received are extremely interesting, and can be helpful to other school officials who seek the most value for the school construction dollar. Names and locations of the officials quoted here may be obtained by writing the home office of Monarch Tile Manufacturing, Inc., San Angelo, Texas.



WE ASKED —

"How would you compare ceramic wall tile with other wall surfaces?"

"Ceramic tile is the wall surface for us," says a superintendent in a small town. *"Ceramic tile has first priority,"* states a deputy superintendent in a city of more than a million population. *"One of the best,"* comments a school architect in another large city. *". . . far superior . . .,"* says a superintendent in a western state. Others commented on lower maintenance, beautiful colors, durability and superiority. There were no negative answers on this subject.

WE ASKED —

"Can you estimate savings in cleaning and maintenance costs?"

Every reply stated that cleaning and maintenance costs definitely were reduced, with one superintendent saying, *"It has made cleaning practically unnecessary."* A superintendent in a Rocky Mountain State commented, *"Our custodians are very enthusiastic about ceramic tile walls . . . I estimate a saving in maintenance of at least one third."* Another actually estimated a saving of 80 per cent.

WE ASKED —

"In what school areas is Monarch Tile the best wall surface?"

The replies to this question listed school corridors, laboratories, kitchens, dining rooms, gymnasiums, work shops, toilets, wash rooms and locker rooms. Monarch Tile currently is in use in all of these areas in many schools, as well as in classrooms in some of them.

WE ASKED —

"What other comments can you make about Monarch Tile in schools?"

"I would prefer ceramic wall tile in lieu of all other finishes," says a big city superintendent. *"Ceramic wall tile has a great number of uses in school buildings,"* is the belief of another superintendent, who adds, *"we believe that ceramic wall tile does as much for the beauty of the buildings as any other single factor."* The small towns agree, as indicated by this superintendent who says simply, *"We are very pleased."*

AND NOW —

Consider
Monarch Tile
For your schools

Please remember that this report comes from school officials who are using Monarch Tile today, with some of them having used it for many years. Most of them quoted here have indicated that they will furnish additional information upon request. Just tell us what you want to know, and we will give you names and addresses of school officials who have the facts you want. Write Monarch Tile Manufacturing, Inc., San Angelo, Texas.

Monarch TILE

Monarch TILE MANUFACTURING, INC.

Member, Tile Council of America

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B4/Du

with SOLID WOODS

Coil-Wal®

Two automatic-electric COIL-WALS (one 24' x 98' bi-parting partition and one 24' x 50' single partition with pass door) serve to divide this high school gymnasium into two or three separate areas.

AUTOMATIC*
COIL-AWAY
PARTITIONS

FOR GYMNASIUMS
AUDITORIUMS
STAGES, ETC.

NEW FEATURES --

- Floor Guide Optional
- "Fully Retractable Pass Doors"
- Contoured End Sections

Patent Applied For

AIA File No. 22-11-C

COIL-WAL PARTITIONS COMPANY P. O. Box 96, Dyersville, Iowa

DIVISION OF DUBUQUE PRODUCTS, INC.

Coil-Wal combines modern beauty with long-life durability to provide the easiest operating, most dependable movable partition built.

Openings as large as 120 feet wide by 30 feet high can be accommodated by COIL-WAL at far less cost than ordinary panel partitions — an important consideration where appearance and quality must be maintained in the face of tight building budgets.

Minimum storage space requirements permit the architect unlimited flexibility in the matter of location, placement, and concealment.

For complete and lasting satisfaction, specify COIL-WAL on any job requiring space dividers.

This beautiful 14' x 48' automatic-electric COIL-WAL partition divides the council chambers of a new city hall building. Note how well COIL-WAL harmonizes with modern building materials and design.

Coil-Wal®

3-INCH CLEARANCE between bleachers achieved through straight-line travel increases seating capacity.

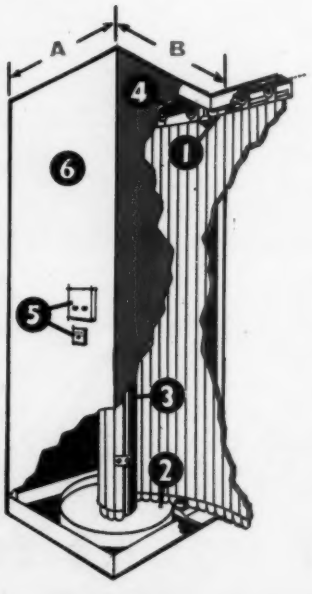
COIL BOX

The heart of COIL-WAL's smooth automatic operation lies in its coil box design. As curtain leaves track at point (1), storage-load is guided and shifted to spindle base (2) while gear-driven spindle (3) exerts the coiling action . . . To draw curtain, power is transferred to cable (4) which runs the length of track . . . Key-switch and selector control (5) may be located at option of architect . . . In exposed installations, box is completely sheathed.

CURTAIN SIZES

Opening Width	Coil Box	
	A	B
10'-0"	21½"	19"
15'-0"	23½"	21"
20'-0"	27½"	25"
25'-0"	29½"	27"
30'-0"	30½"	28"
35'-0"	31½"	29"
40'-0"	33½"	31"
45'-0"	34½"	32"
50'-0"	35½"	33"
60'-0"	37½"	35"
80'-0"	40½"	38"
100'-0"	44½"	42"

CUSTOM-BUILT to any height or length to meet any architectural condition



ONLY *Coil-Wal* OFFERS ALL THESE IMPORTANT PLUS-FEATURES!

MINIMUM STORAGE SPACE — COIL-WAL requires less storage space than any other type of divider and is completely contained within its own tamper-proof storage box.

LESS WEIGHT TO SUPPORT — COIL-WAL weighs *less than 3 lbs. per square foot* (including hardware and accessories) eliminating the need for extra heavy overhead trusses or beams.

MAXIMUM VERTICAL CLEARANCE — Straight-line travel permits mounting of track next to supporting beam, truss span, or truss to utilize full clearance under supports. This feature also permits flush ceiling installations.

GREATER SAFETY — COIL-WAL has no folding action to cause pinching or injuries. Its flexibility absorbs impacts which otherwise might result in serious bodily injury. Neoprene-covered sponge rubber on lead stile prevents accidental injury in closing — assures tight closures.

NO OVERHEAD STORAGE LOAD . . . COIL-WAL curtain weight is transferred to spindle base as it leaves track. No build-up of weight on overhead supports at any point.

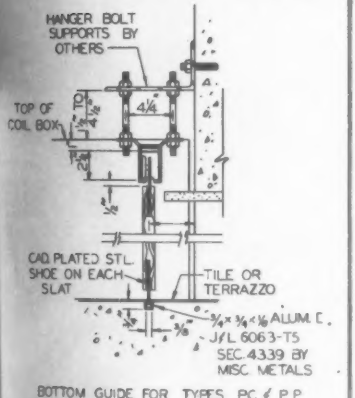
DURABILITY GUARANTEED — Clear, straight-grained, warpage-free woods; quality hardware and fittings; plus the inherent strength and flexibility of COIL-WAL design withstands an incredible amount of abuse without damage to partition or operating mechanism.

BETTER ACCOUSTICAL QUALITIES — COIL-WAL'S grooved, multi-slat design greatly reduces echo over that of flat partitions. Tight closures at floor and ceiling further aid, not only in sound reduction, but in the elimination of drafts as well.

EASIER CLEANING and MAINTENANCE — Finely finished surface makes cleaning easy. There are no threshold plates or load-bearing floor channels to hinder floor cleaning. (A single ⅜ inch wide groove is the only floor guide required.)

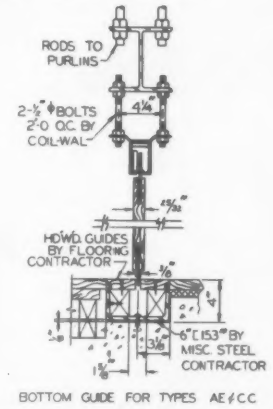
DUBUQUE PRODUCTS, INC. Dyersville, Iowa

TYPICAL MOUNTING DETAILS


HANGER BOLT SUPPORTS BY OTHERS
TOP OF COIL BOX
4¼
CAD. PLATED STL. SHOE ON EACH SLAT
TILE OR TERRAZZO
¾ × ¾ × ⅛ ALUM. ∠ J & L 6063-T5 SEC. 4339 BY MISC. METALS

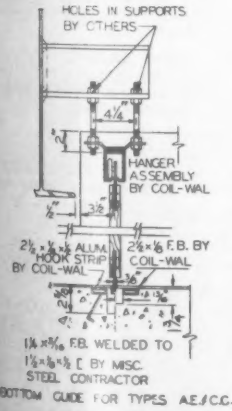
BOTTOM GUIDE FOR TYPES PC & PP

Showing COIL-WAL mounted to side of concrete beam. Note how all track and hangers are hidden above ceiling level.



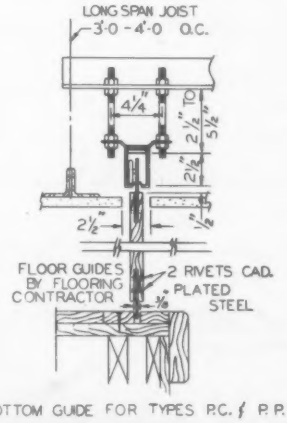
BOTTOM GUIDE FOR TYPES AE & CC

COIL-WAL suspended from purlins by means of I-beam and rods. If suspended ceiling is used, entire track and hanger may be concealed.


HOLES IN SUPPORTS BY OTHERS
4¼
HANGER ASSEMBLY BY COIL-WAL
2½ × ⅛ × ⅜ ALUM. HOOK STRIP BY COIL-WAL
2⅜ × ⅛ F.B. BY COIL-WAL
1¼ × ⅜ × ⅛ F.B. WELDED TO 1½ × ⅛ × ⅛ ∠ BY MISC. STEEL CONTRACTOR

BOTTOM GUIDE FOR TYPES AE & CC

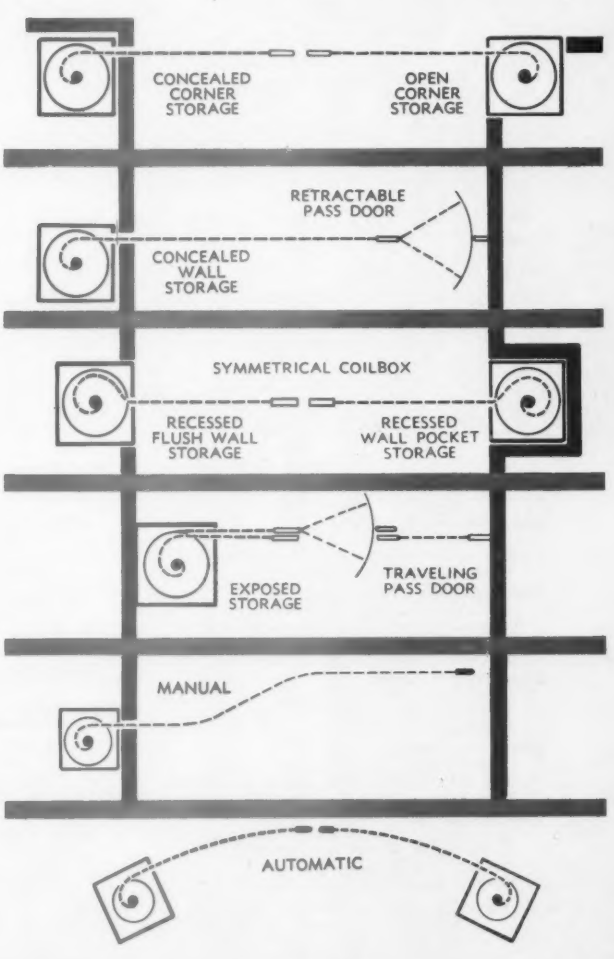
COIL-WAL straight-line travel permits mounting of track alongside structural I-beam by means of channel iron supports.



BOTTOM GUIDE FOR TYPES PC & PP

Completely concealed mounting supported from long-span joists. Note detail showing platform-edge of floor guide.

TYPES OF INSTALLATIONS



Consult factory for special curved track COIL-WALS available in automatic and manual types.

— Write Factory For Free Architects Detail Brochure —

GENERAL SPECIFICATIONS

I. COIL-WAL PARTITIONS SPECIFICATIONS

Furnish and install at locations shown on plan, Dubuque Coil-Wal partitions as manufactured by Dubuque Products, Inc., Dyersville, Iowa, or approved equal and in accordance with the following specifications.

II. COIL-WAL PARTITIONS

(a) CURTAIN shall be factory assembled from select vertical grain Douglas fir, (or other suitable species), slats. Slats shall be kiln dried and treated at the factory to protect against moisture absorption. The partition shall be closely joined with prestressed steel cables and fitted with continuous slat shoes and hangers which shall be expertly attached to prevent misalignment or slat separation. PAINT OR OTHER FINISH TO BE APPLIED UNDER PAINT SECTION.

(b) LEAD STILE shall be of appropriate size to effect suitable closure and shall be fitted with sponge rubber nosing and neoprene facing, except on manually operated closures that have recessed jambs or lock-latches. LOCKING DEVICES AND PULL HANDLES UNDER HARDWARE SECTION.

(c) COIL BOX for all sizes and types of Coil-Wals shall be a sturdily designed steel frame to safely support the imposed loads when in a stored position. PANELS WITH REMOVABLE ACCESS PORTS TO COVER COIL BOX FRAME BY GENERAL CONTRACTOR.

(d) OPERATION OF COIL-WAL SHALL BE AS FOLLOWS:

(1) AUTOMATIC ELECTRIC (AE) shall include motors, reversing controls, key selector switch and limit switch, all of which are assembled in the coil box and electrically interconnected at the factory. Mechanism shall be designed with shear pins and safety controls for overload protection. Motors shall be 115 Volt single phase 60 cycle for ¼, 1/3 or ½ HP and 220 volts three phase for 3/4 HP. FIELD CONNECTION TO POWER SOURCE AND REMOTE LOCATION OF CONTROLS BY ELECTRICAL CONTRACTOR.

(2) CRANK IN-CRANK OUT (CC) mechanism can be provided for Coil-Wals up to 1,000 sq. ft. with removable hand crank.

(3) PULL OUT-CRANK IN (PC) — This type is particularly suitable for single curve, ess curve or around the corner, (minimum 24" radius), installations not exceeding 1,000 sq. ft.

(4) PUSH IN-PULL OUT (PP) for wardrobe or concession closures up to 150 sq. ft.

(e) UPPER TRACK shall be minimum 18 gauge to maximum 14 gauge to safely support partition load and shall be complete with hangers, clamps and bolts that are easily adjustable for height. BOLT HOLES IN OVERHEAD SUPPORTS OR BRACKETS BY STEEL CONTRACTOR.

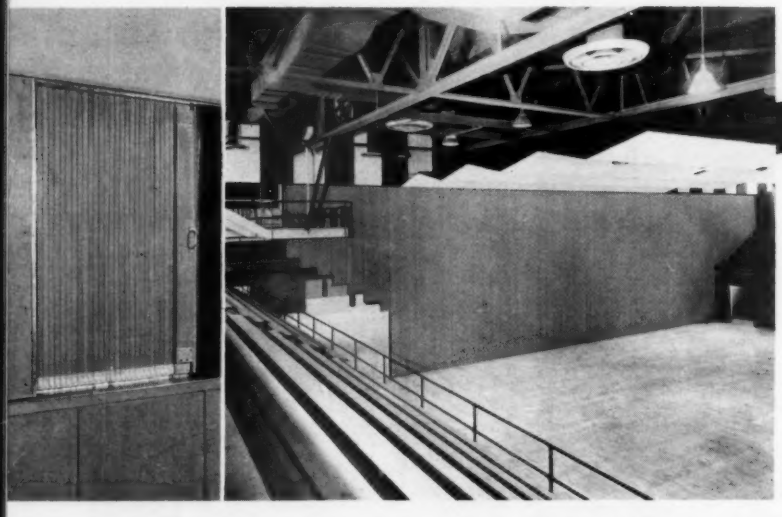
(f) GUIDES AT FLOOR shall be as shown on the drawings. Coil-Wal manufacturer to furnish aluminum floor guide for concrete-tile floors. Steel channel anchoring device shall be provided for wood floor guides in large room areas to control moisture expansion and bulging of floor. STEEL ANCHORING DEVICES TO BE FURNISHED AND INSTALLED BY STEEL CONTRACTOR — WOOD FLOOR GUIDE BY FLOORING CONTRACTOR.

(g) NO FLOOR GUIDE REQUIRED ON CLOSET CLOSURES.

(h) WRITE FACTORY FOR COMPLETE DETAILED SPECIFICATIONS.

Guaranteed

for a period of one year from date of installation against faulty materials or workmanship. Manufacturer or his authorized agent will also provide inspection, maintenance, or adjustment service at a nominal cost for repairs or maladjustment occurring as the result of vandalism or failure, sagging or shifting of adjacent, attached or surrounding materials furnished or installed by other.



Coil-Wal

CONCESSION AND WARDROBE CLOSURES WITH OR WITHOUT BOTTOM G

SPECIAL CONTOUR TO BLEACHERS 26' x 120' SINGLE COIL-WAL

TYPICAL INSTALLATIONS

CALIFORNIA (Downey)
DOWNEY SR. HIGH SCHOOL
Single Coil (AE) Coil-Wal 104'0" x 25'0"
Harry T. McDonald, Arch.

CONNECTICUT (Ridgefield)
RIDGEFIELD HIGH SCHOOL
Single Coil (AE) Coil-Wal 87'0" x 26'0"
Single Coil (CC) Coil-Wal 9'0" x 26'0"
Sherwood, Mills & Smith, Arch.

ILLINOIS (Oak Park)
LINCOLN SCHOOL
Single Coil (AE) Coil-Wal 48'6" 20'0"
Perkins & Will, Arch.

IOWA (Fort Madison)
SENIOR HIGH SCHOOL
Bi-Part (AE) Coil-Wal 118'4" x 23'9"
Karl Keffer Associates, Arch.

KANSAS (Prairie Village)
SHAWNEE MISSION HIGH SCHOOL EAST
Bi-Part (AE) Coil-Wal 53'7" x 16'0"
Perkins & Will, Arch.
Neville, Sharp & Simons, Arch.

MASSACHUSETTS (Bedford)
HANSCOM AFB ELEMENTARY SCHOOL
Single Coil (AE) Coil-Wal 60'0" x 14'0"
The Architects Collaborative, Arch.

MICHIGAN (Fraser)
FRASER HIGH SCHOOL
Single Coil (AE) Coil-Wal 111'6" x 22'6"
Robert C. Wakely, Arch.

MINNESOTA (Wayzata)
WAYZATA ELEMENTARY SCHOOL
Single Coil (AE) Coil-Wal 60'0" x 18'0"
Haarstick Lundgren & Associates, Inc., Arch.

NEBRASKA (Omaha)
ARCHBISHOP RYAN MEMORIAL
HIGH SCHOOL
Single Coil (AE) 89'0" x 22'0"
Leo A. Daly Company, Arch.

NEW YORK (Plattsburgh)
PLATTSBURGH AFB ELEMENTARY SCHOOL
Single Coil (AE) Coil-Wal 58'0" x 14'0"
Knappe & Johnson, Arch.

OHIO (Mansfield)
MADISON EAST ELEMENTARY SCHOOL
Single Coil (AE) Coil-Wal 57'0" x 20'0"
Marr-Knapp-Crawfis, Arch.

PENNSYLVANIA (Turtle Creek)
ELECTRIC PLAN SCHOOL
Single Coil (AE) Coil-Wal 47'2" x 20'5"
The Warnick Company, Arch.

TEXAS (Port Arthur)
PORT ARTHUR HIGH SCHOOL
Single Coil (AE) Coil-Wal 150'0" x 23'11"
Caudill Rowlett Scott & Associates, Arch.

WASHINGTON (Spokane)
GLOVER JR. HIGH SCHOOL
Bi-Part (AE) Coil-Wal 81'9" x 22'0"
Whitehouse & Price, Arch.

WASHINGTON (Longview)
LOWER COLUMBIA JUNIOR COLLEGE
Single Coil (AE) Coil-Wal 96'0" x 23'0"
McGuire & Muri, Arch.

Coil-Wal

COIL-WAL PARTITIONS COMPANY

P.O. BOX 96, DYERSVILLE, IOWA

Division of Dubuque Products, Inc.

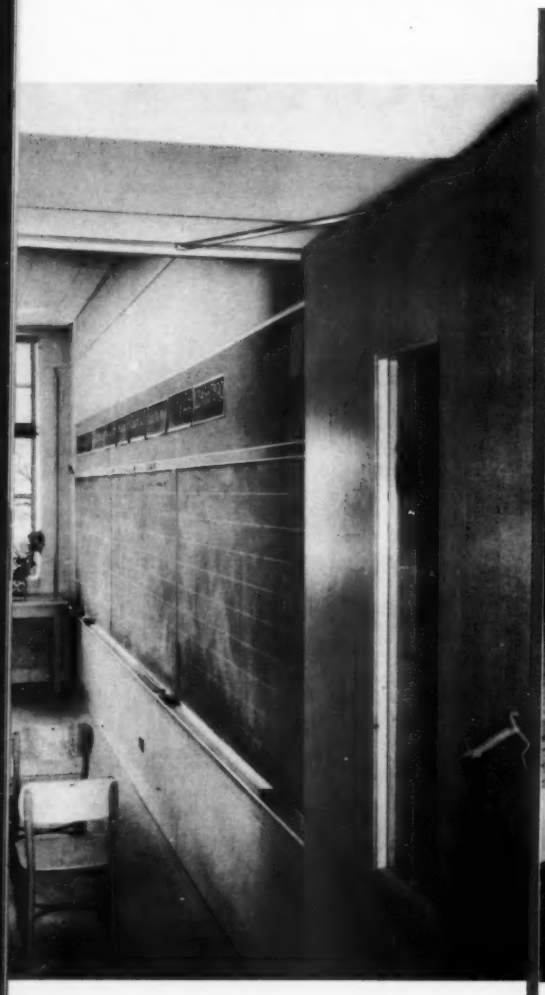
B-6/GL

GLYNN·JOHNSON HARDWARE FOR *protective control* OF SCHOOL DOORS

PROTECTS walls, reveals, jambs, hinges and other hardware. Pays for itself in lower maintenance and repairs. One quality installation for the life of the building.

your specification means more when you insist on GJ quality

protective control at its best
for CLASSROOM DOORS



OVERHEAD INSTALLED

The ideal installation when door opening can be limited to 110° or less.

GJ 500 series
concealed or surface

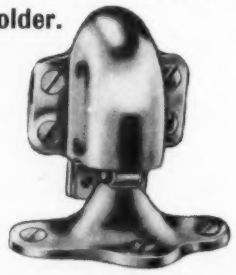
the utmost in a cushioned stop . . .

Quiet, cushioned, shock absorbing function. Overhead means out-of-the-way — no stumbling hazard. Models available for mortising (concealed) into the door and for surface mounting on the door.

FLOOR INSTALLED

for doors to be held open any position to 180°.

GJ F 40 rubber bumper and automatic holder.



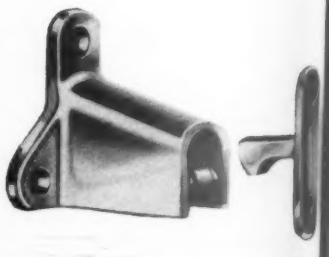
This simple, fool-proof device is the quietest for floor installations.

Holder automatically engages strike and is released with firm pull. Rounded design discourages children from riding the door portion.

WALL INSTALLED

can be installed at top or bottom door.

GJ W 40 bumper and automatic holder.



Ideal for slanting reveals.

Strike silently engages and holds do Door is released with a firm pull. S stantially built for long wear.

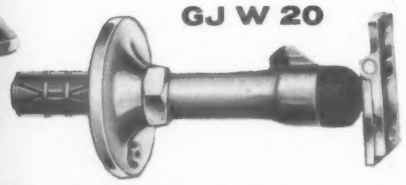
GJ combination door stops and holders

FLOOR and WALL

economy installations to suit limited budgets.

GJ F 20

GJ W 20



Bumpers have limited cushioning effect. Hold-open and release are manual. Otherwise of the same long-wearing, high GJ quality.

SPECIAL PURPOSE HARDWARE

for holding door only . . .

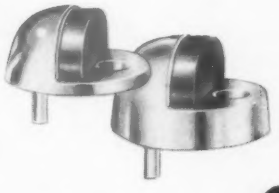
Holders with firm gripping rubber shoes hold door at any position.

GJ 4 lever action holder can be flipped up to stay in upright position.

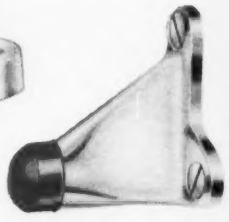
GJ 1154 plunger action holder. Contact and spring trigger release by foot.

for stopping door only . . .

GJ FB 18
floor type door stop and bumper

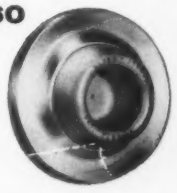


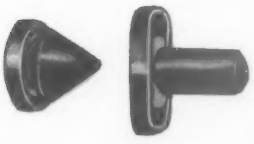
GJ FB 13
GJ FB 14
dome type bumper. Styles adapted to installations with or without thresholds.



GJ WB 35
wall type bumper with sloping top to discourage riding.

GJ WB 50 **GJ WB 60**
TAMPER PROOFED WALL BUMPERS. Mounting screws not visible to pranksters. WB 60 accepts knob of button type locks.

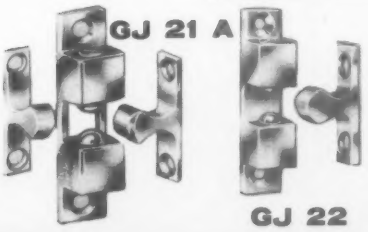




GJ 64 **for metal frames**
GJ 65 **for wood frames**
Pneumatic cushion gray rubber silencers absorb shock of door closing and eliminate lock rattle.

for latching cabinet doors . . .

(also used to latch sliding doors)



GJ 21 A

GJ 22

One permanent installation—no repairs or replacement.

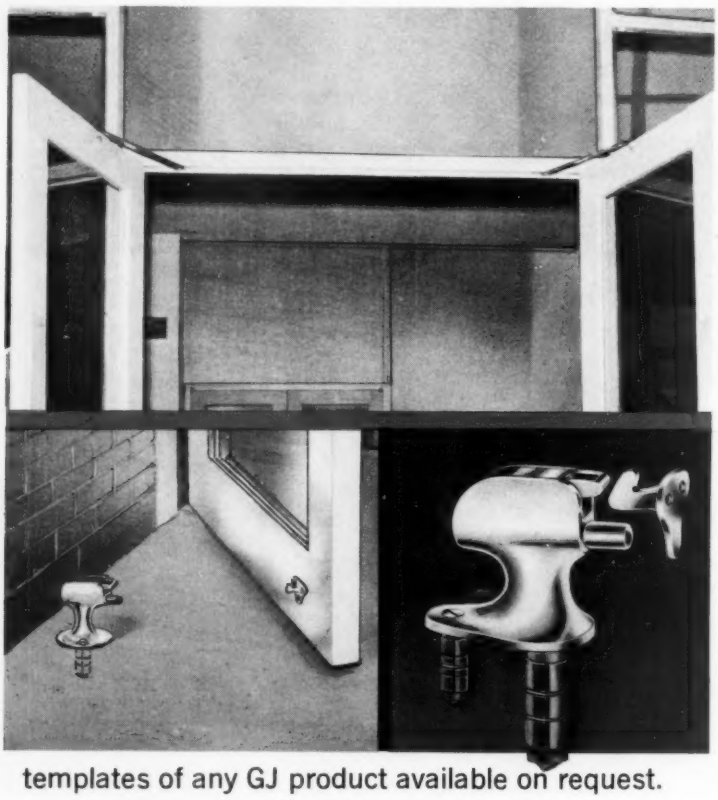
Stainless Steel ball and spring under pressure "pulls" doors snugly shut. Economy 2-way models available where school budget is limited.

PROTECTIVE CONTROL for entrance and vestibule doors

OVERHEAD INSTALLATIONS hold doors at maximum of 110°

5 styles for varying budget and installation requirements.

All overhead models function as silent, shock absorbing door stop and door holder with safety release. They can all be installed in combination with surface or floor type door closers. Being overhead they are out of the way and create no stumbling hazard.



templates of any GJ product available on request.

GJ 100 - GJ 200 — The highest quality concealed installation. For both single and double acting doors — offset, center hung and butt hung.

GJ 90 — The finest surface type installation. Can be installed on existing doors.

GJ 80 — Durably made for moderately priced surface installations.

GJ 70 — A stout, practical device specified to suit limited school budgets.

FLOOR INSTALLATIONS for doors to be held open beyond 110°

GJ F 9 and F 10 - Can be set to function as automatic door holder or as spring cushioned bumper only.

GJ REPRESENTATIVES

WEST	Washington, Oregon, Idaho, Alaska	S. G. Kirkland & Associates	845 Bellevue Ave. East, Seattle 2, Wash.	East 2-8855
	California (North), Nevada	John P. Whitty & Son	1030 Arlington Blvd., El Cerrito 7, Cal.	Landscape 4-5834
	California (South), Arizona	Russell & Associates	2332 S. Atlantic Blvd., L.A. 22, Calif.	Angelus 8-9317
	Colo., Utah, Wyoming, New Mex., Texas (El Paso) & Montana	L. E. Cleavinger & Associates	616 Cochran Bldg., Denver 2, Colo.	Keystone 4-7313
CENTRAL	Missouri, Iowa, Kansas, Nebraska	B. E. Ericsson, Jr.	5316 Canterbury Rd., Shawnee Mission, Kan.	Skyline 1-3030
	Texas, Okla., Louisiana (N.W.), Arkansas	S. H. Kemp Company	2808 Oak Lawn, Dallas 19, Texas	Lakeside 1-3955
	Minn., No. & So. Dakota, Wisc. (N.W.)	Roland H. Gedatus	2094 Timmy St., St. Paul 18, Minn.	Glenview 4-1313
	Illinois, Wisconsin	Harold J. Ericsson	4422 No. Ravenswood, Chicago 40, Ill.	Uptown 8-5500
	Michigan, Ohio (Toledo)	Mark C. Stebbins & Sons, Inc.	8349 Joy Road, Detroit 4, Mich.	Texas 4-3951
	Indiana, Kentucky, Tennessee (West)	John P. Cleveland & Assoc.	1706 "I" Avenue, New Castle, Ind.	Jackson 9-3401
	Louisiana (S.W. to E.), Miss., Alabama, Florida (West)	Harold V. Toop & Assoc.	2414 - 14th St., Gulfport, Miss.	University 3-8384
	Ohio, Pennsylvania (West), West Virginia	Van Delden, Inc.	2000 Lee Rd., Cleveland Hts. 18, O.	Fairmont 1-5062
EAST	Massachusetts, Maine, Conn., N. H., Vt., R.I.	Kenneth H. Bullard Co.	15 Boylston Pl., Brookline 47, Mass.	Aspinwall 7-3330
	New York, Pennsylvania (N.E.)	T. E. Davidson & Assoc. Inc.	1962 Teall Ave., East Syracuse, N. Y.	Hempstead 7-5383
	New York (Metrop. & L.I.), New Jersey (No.), Conn. (S.W.)	Fred G. MacKenzie Co., Inc.	107 Reade St., New York 13, N.Y.	Barclay 7-6852
	Pennsylvania (East), Delaware, New Jersey (South)	G. Norris Williams	8109 Heacock Lane, Wyncote, Pa.	Turner 4-1929
	Wash. D.C., Md., Va.	Lloyd R. Anderson	6804 Millwood Rd., Bethesda, Md.	Oliver 4-4873
	Georgia, No. & So. Carolina, Florida, Tennessee (East), Cuba	Glenn D. Robertson	4210 Club Drive, N.E., Atlanta, Ga.	Cedar 7-0135
	Canada, East of Alberta	K. M. Thomas Co. Ltd.	209 Davenport Rd., Toronto 5, Canada	Walnut 4-1105
	Canada, Vancouver, British Columbia	Hans W. Carstens	6876 Marguerite St., Vancouver 14, B.C.	Amherst 1-3537
	Hawaii	B. F. Schoen, Inc.	303 Keawe St., Honolulu 1, Hawaii	587-121

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Comfort Conditioning for Educational Buildings

by J. Raymond Carroll and Harlan D. Bareither

Professors of Mechanical Engineering, University of Illinois, and Partners, J. Raymond Carroll & Associates, Engineering Consultants, Champaign-Urbana, Ill.

Professors Carroll and Bareither teach heating, air conditioning and related subjects and supervise various graduate studies and projects at the University of Illinois. In addition, their private consulting practice offers design services pertaining to mechanical and electrical equipment of buildings. They have had extensive experience in church and school design and are frequently consulted by building committees to aid in the development of programs leading to optimum environmental control. Both professors have written many technical papers and are co-authors with S. Konzo of two air conditioning textbooks.

THE EDUCATIONAL BUILDING of tomorrow must be designed for year round comfort conditioning. A fast-growing population of school age children and education-minded adults means that the physical plant will be open many more hours each day and continuously through summer months. When the indoor climate is controlled and conditioned, an optimum educational environment is produced regardless of outdoor variations in weather or indoor variations in occupancy and usage.

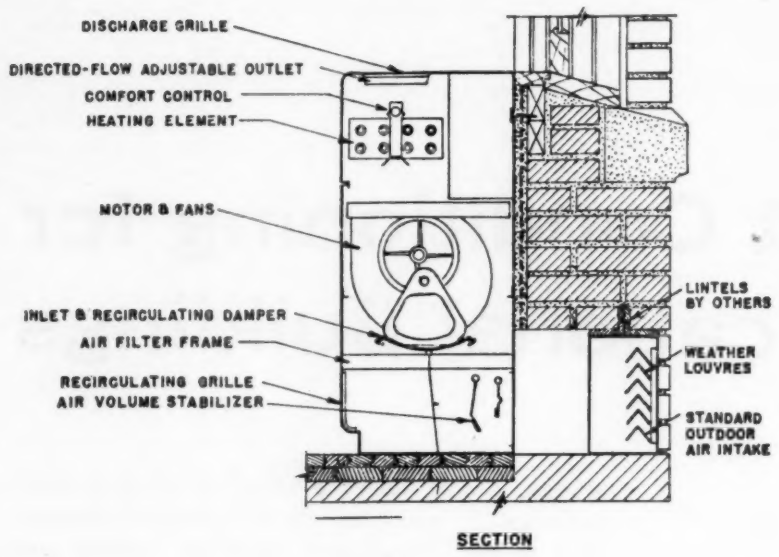
Old methods of heating, using uncontrolled radiators or convectors with or without fixed exhaust systems, can no longer be tolerated. Air in a building must be controlled for temperature, distribution, motion, cleanliness, humidity, purity and odors (even to the extent of introducing desired odors). When surface temperatures of surrounding walls, ceilings, floors, and glass are controlled the occupants can wear lighter clothing and feel refreshed and invigorated because the general atmosphere and surroundings are more comfortable.

Methods and equipment are available today to produce tomorrow's environment. The basic elements required are desire and necessity. Necessity is being spurred by changing methods of teaching and larger classrooms. Desire will follow closely, especially when large numbers of people, crowded together in one room, react to uncomfortable and undesirable atmospheres. The architectural design and arrangement of typical classrooms will change to suit new programs and heating and cooling systems must satisfy the requirements of the occupants irrespective of these changes.

All methods of heating and cooling must include both air and surface temperature control as an important and primary consideration. Air must be "conditioned" or "treated" and then "distributed" to cause a desirable air "motion" but without noticeable drafts. At the same time, a building's construction, insulation and method of heat introduction control surrounding surface temperatures.

Unit Systems

Probably the most widely used classroom heating medium is the unit ventilator. Unit ventilators satisfy the dual function of supplying ventilation air to a room and maintaining desirable temperatures. The system employs a cabinet with a fan and heating coil, located at the outside wall in each classroom, under a window. A connection is made through the wall to the outdoors for ventilation air and also to the room for recirculated air. The



Typical unit ventilator installed at outside wall. Heating element may be either steam coil, hot water coil or electric coil. (Courtesy John J. Nesbitt, Inc.)

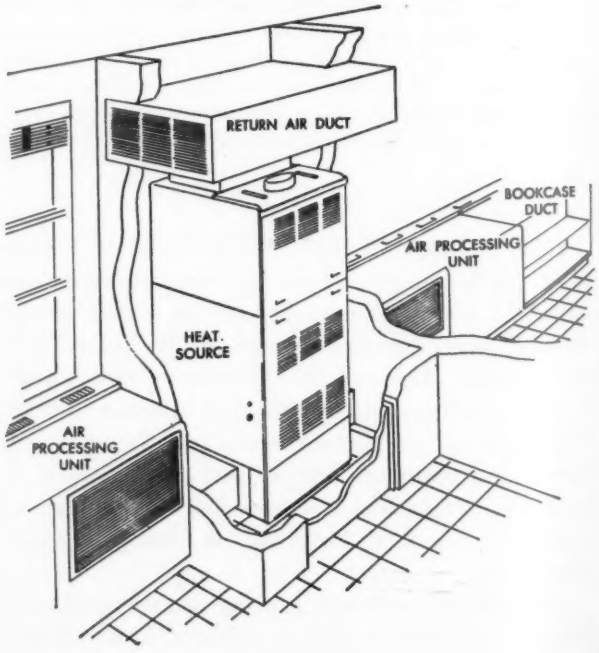
amount of air brought into the unit ventilator through the recirculated or ventilation air opening depends upon a damper setting controlled by conditions within the room. Air goes through the heating coil into the fan and is discharged out through the cabinet top to control any downdrafts caused by cold window glass.

There are many control systems for unit ventilators but generally there is a thermostat in the room for normal periods of occupancy (day). Zone thermostats within the building regulate all units during normal unoccupancy (night). Since ventilation air is not required at night, the unit recirculates all the air during this period. In the morning, before students enter the building, the control system transfers to day operation and the temperature is increased to a desired comfort level. When the warm up period is completed, ventilation air is delivered in the minimum desired quantities. If the heat given off by lights and the students themselves should cause room temperatures to rise above a comfort level, and if the outdoor temperature is below room temperature, more outdoor air will be supplied for ventilation. This is an advantage of the unit ventilator. It can adjust both to outdoor and indoor conditions of its location, thereby eliminating the temperature overrun experienced in systems that cannot automatically vary the quantity of outdoor air.

When unit ventilators are in use, ventilation air is removed by an exhaust fan system. Exhaust air may be drawn through coat locker cabinets from openings at the floor and picked up at the top in a central duct system, thus helping to dry out wet clothing during rainy weather. With unit ventilators the heating operation can be the same whether using steam, hot water, electric or a direct-fired warm air unit located in the room. The only difference is in how energy is supplied to the air distribution unit.

If cooling is considered initially or as a future possibility of the unit system, the type of heating will influence the cooling selection. If hot water is selected for heating, the unit system may be designed to use the same coil and piping all year, for heating or cooling. However, if a steam, electric, or a direct fired unit is selected, an additional coil for cooling must be provided within the cabinet. In some cases, a direct expansion coil cabinet could be placed next to the initial unit. However,

Direct fired unit ventilator for two classrooms. Heat capacity meets total heat loss requirements of both rooms.



remote compressor-condenser units would have to be located outside the building.

If heating is by electricity and air conditioning is a necessity, the practicality of a heat pump should be investigated. A heat pump is a refrigeration unit which can reverse its cycle to supply heat to a space when required. The output of a heat pump is highest in mild climates, but even in colder areas its operation is equal to or less expensive than straight resistance heating.

Central Air Systems

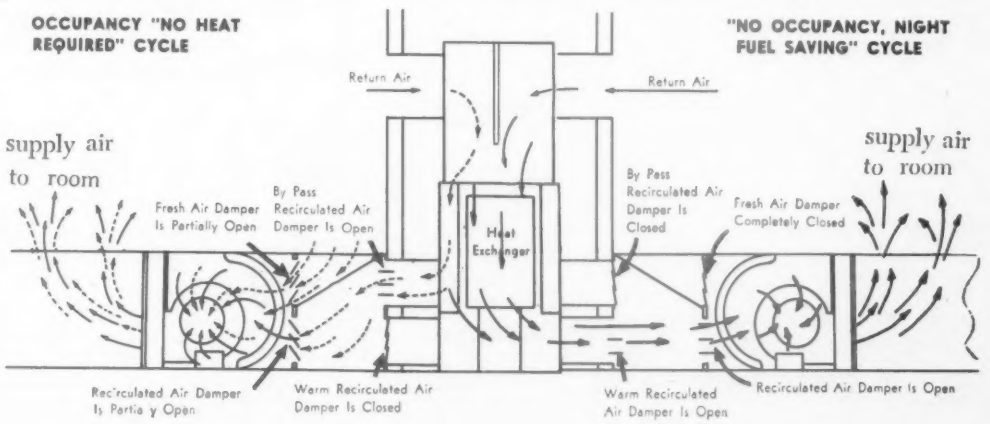
Central air systems have the primary function of providing ventilation air to all rooms and spaces in a building. The inherent advantage is that all mechanical equipment, such as fans, bearings, belts, motors, coils, filters, etc., associated with moving air, are located at one place in the building. Maintenance of this equipment is therefore at a minimum when compared with systems that use multiple small units. Also, the vibration and noise associated with fans are confined and easily controlled away from occupied spaces.

However, the disadvantage of a central air system is that ducts are needed to carry air to and from individual spaces. These ducts are sometimes difficult to contain in contemporary one-story structures and always require careful coordination between engineer and architect for an optimum system. Also, the central air system requires a special room or space for fan and other equipment. In many cases a central air system is the only logical solution for a particular school design, based upon initial cost and other various and sundry considerations.

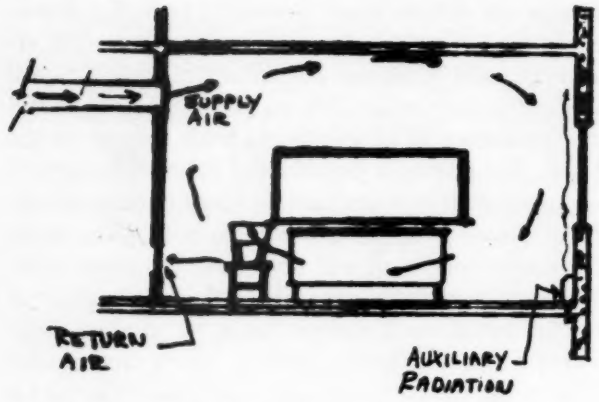
Whether or not a central air ventilation system can provide proper comfort if also used to heat individual spaces depends primarily on the amount of glass exposure and the air distribution method. It is a known fact that large single glass exposures cause downdrafts of cold air to the discomfort of those seated nearby. To be successful, then, a central air system must counteract both the downdrafts and the cold glass effect. Of course, the effect of cold glass on overall room comfort will depend upon the severity of outdoor weather and the arrangement of occupants with respect to the glass. More schools constructed in milder climates use central air systems than do those in far northern areas. Also, a long, narrow room with glass along the narrow end wall will not create the same problem as a room with glass along the side wall. It is obvious that each design must be studied individually for the best approach. There are several basic ways to use central air ventilation systems for control of heating requirements within individual spaces. They are as follows:

1. *Central air with auxiliary radiation.* This is a compromise solution. A central air ventilation system is designed for various reasons, but large glass exposures and the climate may require radiation beneath windows. Radiation can be accomplished by radiators, convectors, baseboards, finned-tube, etc. and is normally used only when the weather is very cold or during night-time and weekends when the central fan is off. The central air system will supply approximately 55°F to 65°F air during mild weather to prevent a room's over-heating from lights, occupancy and solar load. Under these conditions, the room thermostat would probably signal heat from the radiation at various times during the day. This method is fairly expensive since it requires installation of a dual or duplicate set of heating systems. But it is commonly employed in large buildings. Cooling can be added by placing a cooling coil in the central air handling equipment. However, the cooling control problem may require a different duct arrangement.

2. *Central air with reheat.* This method is usually found in buildings with central cooling and where humidity control in the summer is quite important. An educational building with a high occupancy ratio would find this system feasible. The reheat coil is placed in the supply to individual

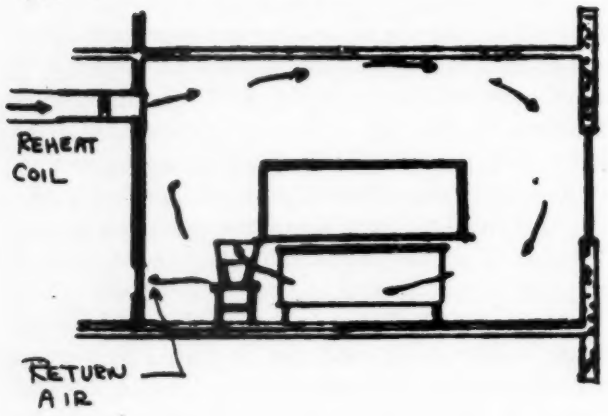

OCCUPANCY "NO HEAT REQUIRED" CYCLE
"NO OCCUPANCY, NIGHT FUEL SAVING" CYCLE
Return Air
Return Air
supply air to room
supply air to room
Fresh Air Damper Is Partially Open
By Pass Recirculated Air Damper Is Open
Heat Exchanger
By Pass Recirculated Air Damper Is Closed
Fresh Air Damper Completely Closed
Recirculated Air Damper Is Partia y Open
Warm Recirculated Air Damper Is Closed
Warm Recirculated Air Damper Is Open
Recirculated Air Damper Is Open

Equipment arrangement for a direct fired unit. Cycle can be set for occupancy and no occupancy. (Courtesy Lennox Industries, Inc.)



Classroom view of central air system with auxiliary radiation. Supply and return air vents are at same side of room.

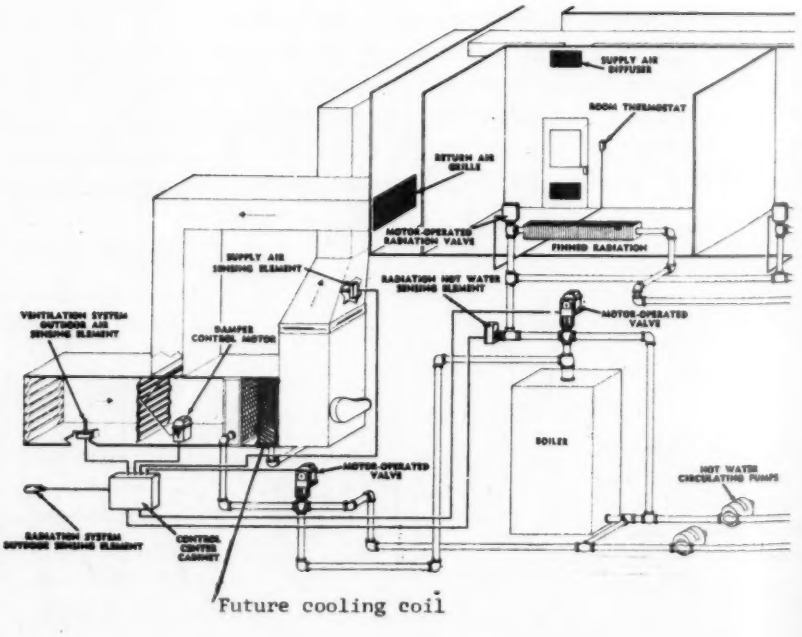
Classroom view of central air system with reheat coil in room supply. Auxiliary radiation is eliminated.



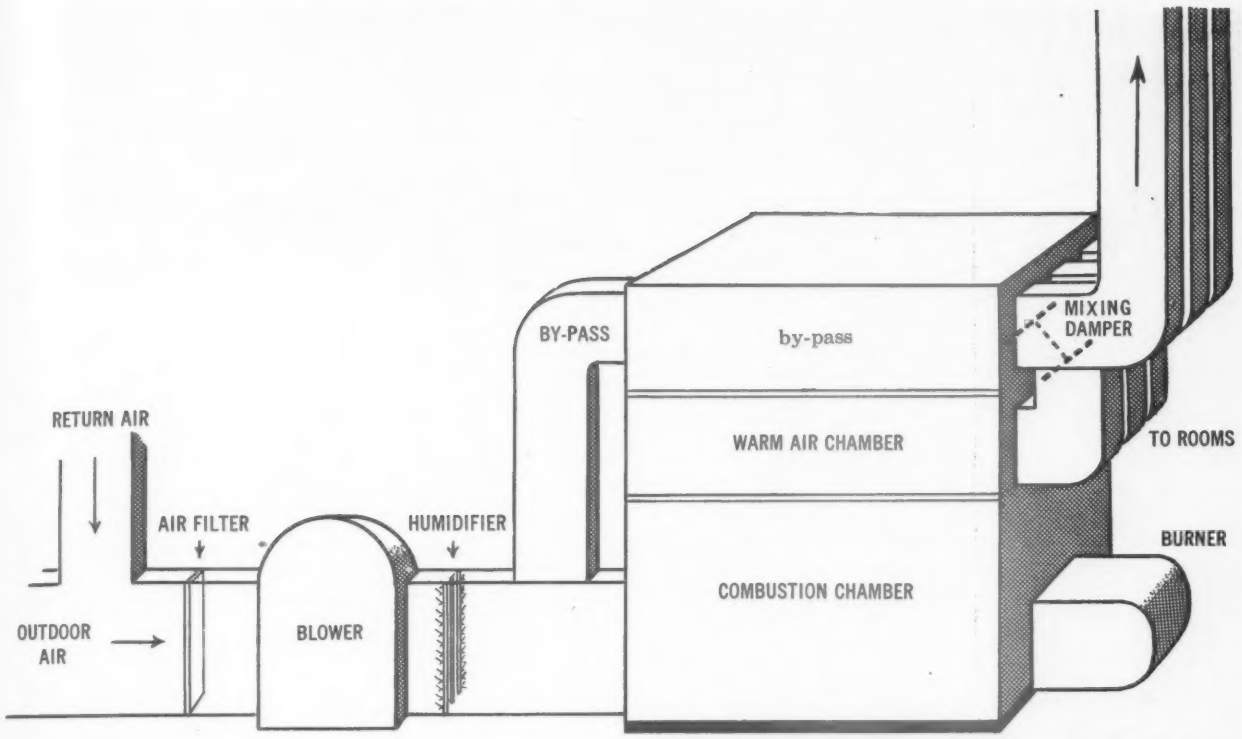
rooms or in each zone duct if more than one room has the same orientation, usage and occupancy. Auxiliary radiation could be included with the reheat coil, but does add to the expense. The central air system can be controlled to supply approximately 55°F to 65°F air, with a room thermostat controlling the reheat coil. A disadvantage is that the reheat coil must be located near the room or zone that it serves, and space requirements sometimes complicate this. Without auxiliary radiation, supply air must be introduced beneath windows in cold climates, but can be projected from the high sidewall or ceiling in warmer areas.

3. *Central air with mixing dampers.* This system, with mixing dampers, has reheat coils but they are at a central position. Air is delivered into two separate ducts, a by-pass or cold duct, and a hot duct. The by-pass duct is maintained at 55°F to 65°F, and the hot duct is varied according to outdoor weather. Each room supply duct is fed from both the by-pass and the hot duct, and a set of motorized mixing dampers, operated by a room thermostat, controls the mixture. Each room or zone supply duct could start at the central fan location and run separately to final position. In this case, all mixing dampers are at the central fan multi-zone location.

However, a second approach is to carry both by-pass and hot ducts all through the building and to take-off from both ducts at each room. This is known as a dual-duct or hot and cold deck system. Mixing dampers are then located at the supply branch duct for each room. Both systems serve the same function and deciding which to use depends



Central air system with auxiliary hot water radiation. Future cooling coil can be included as part of the system.



Central air system with multi-zone damper arrangement. This system can heat, humidify and ventilate classrooms. (Courtesy Minneapolis Honeywell)

upon the space available for ductwork and the relative cost of two larger ducts as compared with a number of smaller ducts.

4. *All-air high velocity.* The speed at which air moves through ducts affects their size. When velocity is increased, duct size decreases. Low velocity systems have a velocity of less than 1,500 feet per minute. High velocity systems are usually designed at 4,000 to 6,000 feet per minute. Smaller ducts permit easier integration with the building structure and may even affect ceiling heights. Any of the air systems previously described can be used with high velocity but, in every case, the high velocity must be reduced to conventional low velocity through a sound attenuation chamber before being introduced into the room.

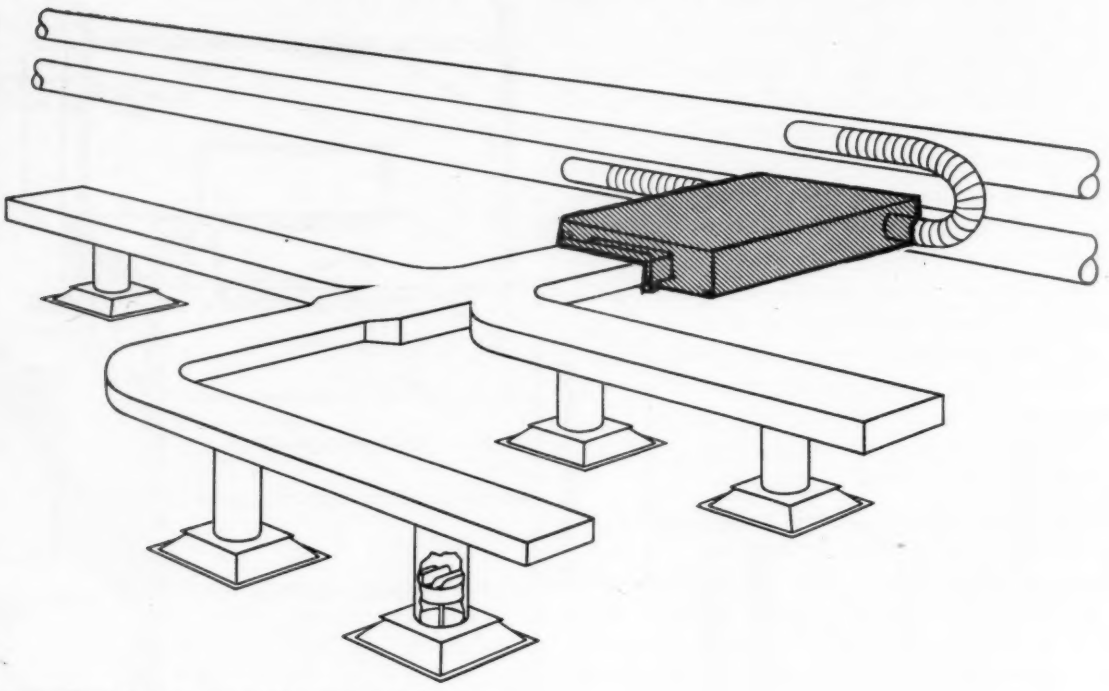
The major advantages of high velocity are small ductwork and ease of balance. Disadvantages are high noise levels, unless provided for, high initial cost, and high operating cost of the central fan. The logical building for high velocity air is the multi-story or large, spread-out building.

5. *High-velocity induction.* With this approach duct sizes are reduced by using high velocity air, but there is no return and some ductwork is eliminated. High velocity primary ventilation air only is delivered to each room. There is no return air to the central fan. High velocity air is introduced through a specially designed induction device that mixes room air with primary ventilation air, for desired circulation and movement. Primary air is temperature controlled by room or zone. If it is impractical to vary the primary air temperature in each room, it could be supplied, at 55°F to 65°F, to each induction unit. A secondary reheat coil in each unit could then be controlled by a room thermostat.

A high velocity induction system is common in very large buildings or in tall buildings. Only ventilation air is delivered by the central fan, and its initial size and operating costs are less than that of a fan handling both ventilation and return air. The initial cost does tend to be high because room type induction units and secondary coils and piping are complex equipment.

Radiant Heating

Surrounding surface temperatures are important to comfort. The human body is a heat producing machine and will lose heat by radiation to all surfaces at a lower temperature. If a ceiling surface is cold, or if the walls or glass are cold, the exposed surfaces of the body "feel" the heat loss by radiation. One method of counteracting this effect is to install "hot" elements within the room, such



High velocity dual-duct system with a mixing box in each room or zone. Mixing box, shaded area, has cool air duct at left, warm air at right.

as radiators, warm ceiling or wall panels, hot pipes, electric heaters, to emit radiation from the same general direction as the cold surfaces. Heat loss from the body to cold surfaces will be counterbalanced by heat radiation to the body from the same direction.

There are many ways to create the hot elements but no satisfactory method has been developed for comfort control. Air introduction is necessary in any case since ventilation air and general air motion are not a part of the radiant heat system. However, radiant systems do find a place in our present schemes and will undoubtedly be used extensively in the future for heating large outdoor or open-air spaces like stadiums, auditoriums, special classrooms, or swimming pools.

Fuels

The fuel used to supply energy to a heating system usually does not affect selection of the system. Perhaps this is why fuel selection receives so little attention. There is a paradox here because fuel cost and equipment create a major operating expense.

Some points to consider when selecting fuel are comparative operating costs, storage space for fuel supply, accessibility to storage space, maintenance cost of fuel burners and equipment, and possible usage for air conditioning. Operating costs differ by geographical areas, affected by local availability of fuels, and it is thus impossible to state that one fuel is less or more expensive than another.

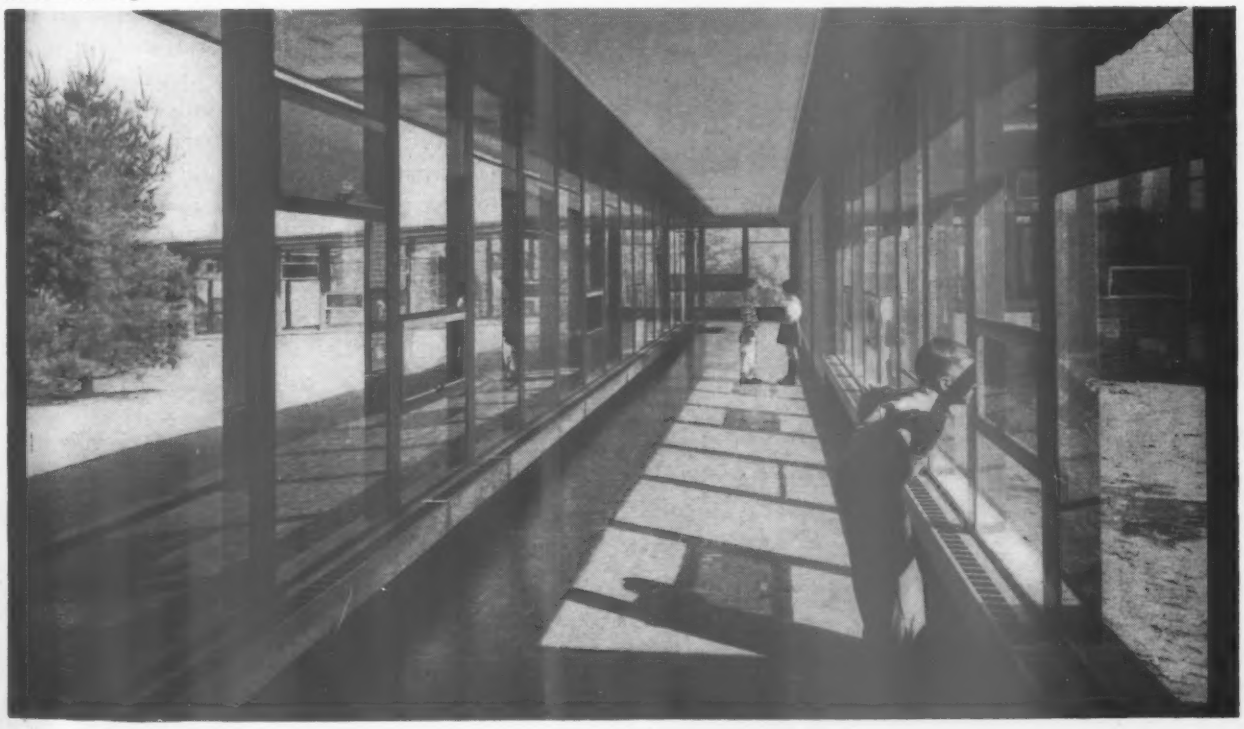
Coal has lost some of its popularity mainly because of the problems involved in its handling and the disposal of ashes. However, with new bin-type stokers and mechanized ash handling equipment, these problems have been minimized and the ashes even become an asset. At some large schools and universities, stoker type fuel is selected in preference to pulverized in order to obtain ashes for road maintenance. In considering coal make sure there will be sufficient storage space for an entire season's supply. Then fuel can be purchased during the summer when prices are lower. Another point in favor of coal is its availability in case of national emergency, or failure or shortage of other fuels.

Oil and gas are both popular fuels because they may be burned automatically. The problem of storage space does exist for oil but large tanks can be installed underground, away from the building. Storage capacity should be sufficient for at least one-quarter of the heating season to prevent excessive deliveries and to take advantage of bulk purchases. Two types of oil are available—heavy oil and light oil. Heavy grade oil has a consistency of molasses when cold and requires tank heaters and preheaters for transportation and combustion. Heavy oil is cheaper than the light grade and the additional cost of equipment may be justified by lower operating costs in large installations. Light

Classrooms with large amounts of window area present special heating and ventilating problems. Units placed at window side of room combat heat loss or gain.

Baseboard radiation in glass-enclosed corridor of this school helps to maintain comfortable temperatures no matter how cold it is outdoors. (Perkins & Will, Architects-Engineers)

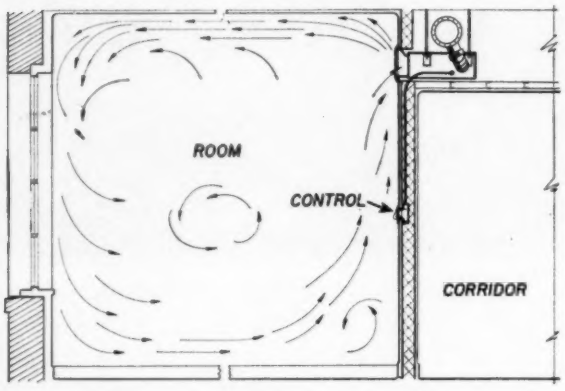
Hedrich-Blessing



grade oil is the same as that used in residences.

Natural gas requires no storage space. However the gas supplier must be able to serve the demand at any time. Usually, gas companies will charge a demand rate based upon the maximum amount of fuel required over a given period. This demand rate is charged even though fuel is not used during summer months. Most companies will supply any quantity of gas without a demand charge if the consumer will use a dual fuel system and convert to another fuel when the outdoor temperature drops below 26°F. The dual fuel system may be a gas-oil or a gas-gas system in which liquefied petroleum gas takes over during the colder weather.

The gas-gas system is preferred because the same burner assembly is used and there are no problems



Typical side wall application of a high velocity single duct system. Sound box is included.

of differing quantities of combustion air and carbonizing of the stand-by burner. These do occur with the gas-oil system. In areas where a demand charge would be made for natural gas, a gas-gas system should be investigated.

Many claims are made pro and con for electric heating. Electricity has many claimed advantages:

1. Clean; no smoke, no fuel leaks or dirt
2. Safe; no flames, no gases, no explosions
3. Odorless; no fumes
4. Convenient; no fuel storage
5. Space saving; no chimney, no boiler
6. Carefree; no servicing, no maintenance
7. Noiseless; no ignition, no roar or rumble
8. Flexible; simple to expand
9. Economical; less cost to install

These advantages may offset the high operating cost of electricity as a fuel. The proof is in careful analysis and evaluation of all factors. The high operating cost necessitates extra insulation of the building to prevent excessive heat losses.

The popularity of air conditioning has resulted in a demand reversal, with maximum demand for power now occurring during summer months instead of winter, since most cooling is by compressor refrigeration systems with electric motor drives. In all probability, a minimum demand charge for electricity will eventually be made during winter months.

When a chilled water system is contemplated, the absorption type refrigeration unit should be considered. This unit utilizes steam or hot water instead of electricity as the energy source. Utility companies look favorably upon the absorption unit and many grant special rates for natural gas for air conditioning during the summer months.

There are many combinations of equipment possible for climate control and more than one solution may exist for any specific case. Before making a final decision or selection, the initial cost, the integration of equipment within the building, the ability of the system to adjust and control conditions for changing climate and expected occupancy, the possibility of adding cooling at a later date, and operational cost, should all be carefully evaluated. And don't forget future needs and possibilities to make sure that tomorrow's needs can be accommodated with a minimum of extra cost or effort.

Electrical Systems for School Buildings

by David Zeidenberg

Associate, Office of William P. Henszey, Consulting Engineer, New York City

Mr. Zeidenberg, a native New Yorker, was graduated from Pratt Institute with a degree in Electrical Engineering. Prior to joining the Henszey organization, he worked with other engineering firms in New York City.

ELECTRICAL DESIGN of schools has progressed so fast that comparison between a 35-year old school and a modern building is like comparing two automobiles with the same age gap. As with other aspects of school planning, electrical design is tempered by budgetary limitations and considerable difference of opinion exists as to what are necessities and what is frosting on the cake.

Our basic approach to the design question is to include all essentials, scaled to the type of school, in the base specification with as many auxiliary parts as necessary. In addition, we prepare alternates which can be included if and when money becomes available. Extensive use is made of empty conduit systems for auxiliary electrical systems in school districts where additional funds will become available in the near future.

Power Distribution Systems

For power distribution systems we include a transformer vault in or adjacent to the building wherever possible. The owner is thereby enabled to purchase power at a more desirable rate and the project is insured a regulated source of power. Power is fed from the vault to the main distribution and metering equipment, usually located in the boiler room. A main distribution circuit breaker panel then supplies the various lighting and distribution panels throughout the building.

All lighting and power distribution panels specified by our office are "dead front" circuit breaker types. We feel these units give the maximum overcurrent and short circuit protection and present a minimum shock hazard to maintenance personnel, teachers and students. Circuit breaker panels make a neat installation and can be kept locked to prevent tampering. There is no shock hazard should a panel be left open by accident and become accessible to unsupervised students.

A building is sectionalized into electrical load areas with a separate panel for each area. All lighting circuits are switch controlled. The use of branch circuit breakers as switches is a bad practice. Switching subjects breakers to a use that is not intended and shortens their life.

All areas of concentrated power loads such as shops, boiler rooms, kitchens, etc., have separate panels. Areas with light power loadings and located near each other in the building plan are grouped together and fed from a common panel.

Lighting Systems

Classroom lighting. The major preference in classroom lighting today is fluorescent lighting. Reasons for this are sound—lower cost of power consumed per classroom and more light output

Hurst

Incandescent fixtures, like those in gym of Madera, Calif., Union High School (Chas. D. James, architect), are usually chosen for such areas.

per watt of power consumed. There are many other considerations like longer lamp life, less heat, less maintenance, etc.

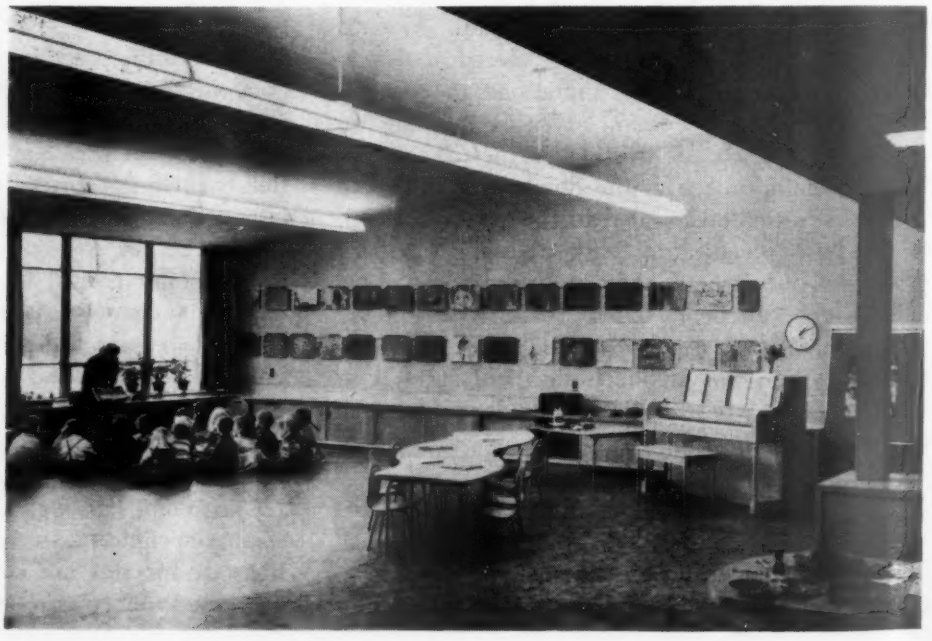
The types of fluorescent fixtures available for use in classrooms are extremely varied. We have found that a good lighting job at minimum cost can result with surface mounted louver bottom fixtures which have translucent white plastic side panels. In recent work we have had excellent results with surface mounted units which incorporate low brightness plastic lenses. The increased photometric efficiency of these units, coupled with a very pleasing appearance, offsets their small extra cost.

Requirements for lighting levels in classrooms are set by most state education departments. It is for the design engineer to fit his particular type of fixture selection to these requirements. It must always be borne in mind that all light sources become less efficient as they age and pick up dirt. Nothing can be done about lamp aging and fixtures are usually cleaned at infrequent intervals when school is not in session. Therefore, the designer must use good judgment in interpreting published output figures for various classroom fixtures in order that light levels in classrooms will remain adequate as time progresses.

Corridor lighting. In corridor lighting the preference is fluorescent lighting for many of the reasons already mentioned for classrooms. Lighting in corridors should be adequate for the safety of students during class changing or emergencies. It is also important, with long corridors especially, for switch controls to be positioned at either end of a hall or at least at the main point of exit from the corridor. Corridor lighting fixtures should be alternately switched. In this way every other light can be turned off when not needed, for instance if sunlight comes in through skylights or during evening hours when the school is being cleaned.

Gymnasiums and auditoriums. Incandescent fixtures are usually chosen for gymnasium lighting. The high ceilings of such areas mean a high intensity, high output unit must be employed. In small schools, where gymnasiums are used only for physical education classes, the design can be based on

Hube Henry, Hedrich-Blessing



Various types of fluorescent fixtures are available for classroom lighting. Strip lights were used in kindergarten of S. C. Johnson School, Racine, Wisc., (Warren Holmes Co., architects).

minimum code requirements. In large gymnasiums where basketball games are held, higher light levels are necessary, and mercury vapor units do an adequate job. Recent developments in this type of lighting have eliminated many former objections to their use. Mercury vapor lamps are now color corrected, restart quite readily and give very high light output per watt of power consumed.

Auditorium lighting, aside from stage lighting which will be discussed later, is quite straightforward. Recessed incandescent downlights are almost a standard. If required, light levels should be high enough for use of the auditorium as a part-time study hall.

Special Systems

Fire alarm systems. Here, only the best will do. Reference to the recent Chicago school fire is a grim reminder. School fire alarm systems fall into three major groupings:

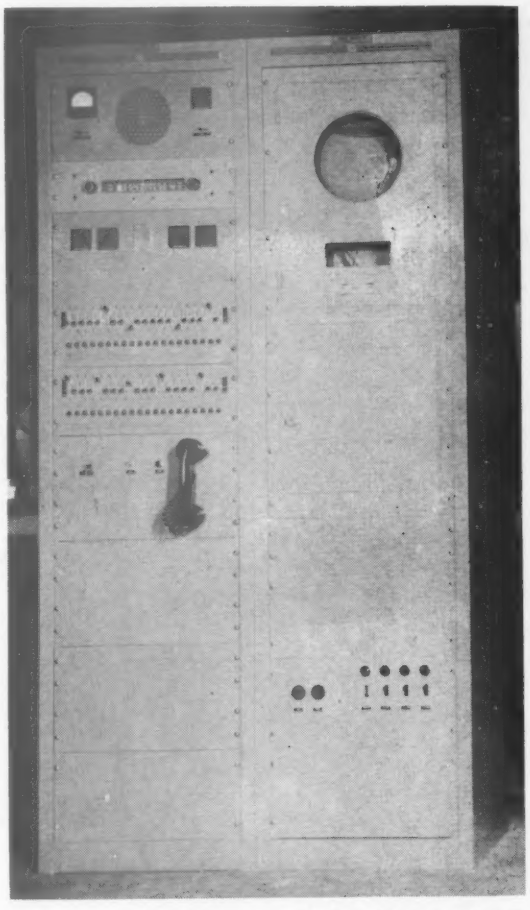
1. Schools in large urban areas with municipal fire alarm systems to tie into. In such areas local fire departments are specific about what goes into the school fire alarm system and will review plans with the architect and engineer before the job goes out to bid.

2. Schools in suburban and semi-rural areas. In these schools the engineer must check for possible ties to a municipal system or contact with the local firehouse by leased telephone lines. It is good practice to include the necessary relays in this type of system to allow future connections to the local firehouse or municipal system.

3. Schools in rural areas. In this type of school the fire alarm system is a self contained entity, capable of giving adequate warning in case of fire.

All fire alarm systems specified in schools should be electrically supervised. This means that any failure or short circuit which develops in the fire alarm wiring will automatically actuate a trouble device which warns that the system is inoperative. The size of the school under design is the deciding factor in whether or not a fire alarm system should be coded. In a large, diverse school it is quite necessary to know from which area an alarm originates.

Clock and program systems. These are seemingly simple, but there are several systems and approaches for the design engineer. Clocks are usually the minute impulse or wired synchronous type. Correction of clocks can be accomplished by wiring or electronic methods. Programming can be handled by punched tape, button board or can be completely divorced from the clock system and fed over the sound system. Our preference is the minute impulse or wired synchronous clock system in elementary schools and the electronic clock system in junior high schools and larger. We recommend programming over the sound system in all cases. A study of the costs of various schools we have designed in the past several years has shown this to be the most economical approach and has met with the approval of all school authorities involved.



Two section sound rack for a school's sound system has blank recesses for master clock and program device.

Sound and intercommunication systems. As the modern school becomes more diverse and the load on both teacher and pupil becomes greater, the role of the intercom system becomes more important. We feel that any modern school should have some means of communication between the teacher and the central office, and a way to page students and teachers in any part of the school or surrounding grounds. Our approach to this is to specify a two-channel-plus intercom system with separate amplifiers for the auditorium and gymnasium. This arrangement gives maximum flexibility to the system, allowing programs originating in the gymnasium or auditorium to be fed to the rest of the school or just to the local area of origination.

Incandescent downlights are almost standard in auditoriums. Stage lighting needs special consideration. Stage lights of Anaconda, Mont., High School can be seen in ceiling recess (Fox & Ballas, architects).

Also incorporated in the sound system rack is a program device which sends out an audible tone to signal class changes. The cost saving over separate program wiring can be considerable in a large school. Other features incorporated in the modern sound rack are an overriding air raid signal, provisions for the principal to address the school or a portion of the school from his office, and the amplification of sound from sound films in large areas of assembly.

Closed-circuit educational television. Among the latest of electrical specification items to be considered in school design, closed-circuit TV is indeed a problem to the engineer. Reasons for this are two-fold. First, educators have not yet reached complete agreement on TV's role as a teaching tool. Second, the medium itself is progressing and developing at an incredible pace. We advise any client interested in closed-circuit TV to add an empty conduit system at the time of construction. Our office has been fortunate to be involved in the design of some pioneer educational TV installations in Suffolk County, Long Island. Basically, these systems have three-camera installations, a view-finder camera, a remotely operated non-view-finder camera and a film diplexing chain for origination of films and slides. Care must be taken to select equipment with simplified controls which can be operated by non-technical personnel and students.

Stage lighting. This is one area where school authorities are apt to scrimp costs and we disagree with them. The absolute minimum stage lighting equipment for any school, regardless of size, is four front spotlights and three rows of border lights equal in length to the size of the proscenium opening. If an auditorium has a projection booth it should have a follow spotlight. If a school has an auditorium with any stage facilities whatever, it should have some sort of dimming equipment to allow the use of the stage to its full limits.

There is nothing that adds so much to a school or community stage production as being able to dim the lights instead of turning them off by switch. Modern techniques in stage board manufacture have given the consulting engineer many fine, small units or "packs" using semi-conductors and electronic tubes, which mount unobtrusively on a wall and give excellent stage lighting control with a minimum of cost and space.

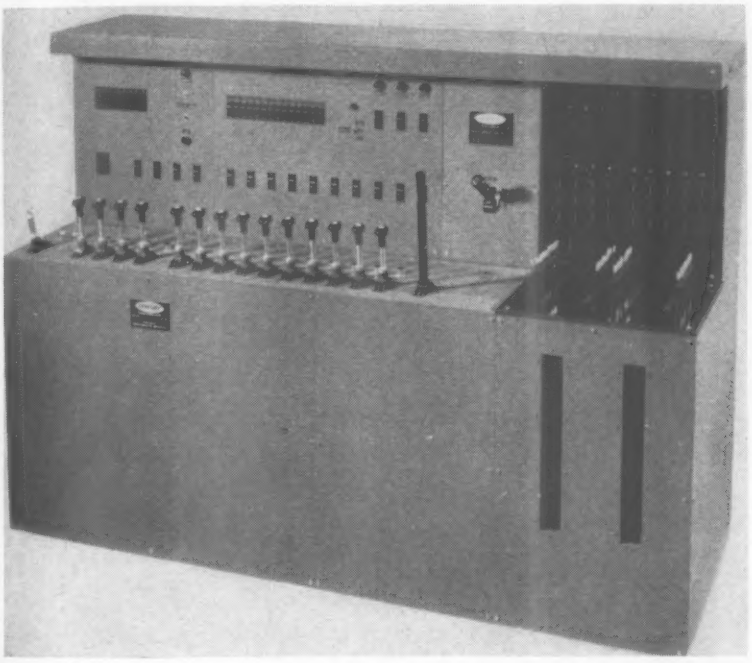
In larger high school auditoriums, a free standing or console board with complete interplugging facilities should be specified. The specification of stage boards and lighting equipment should not be via a brief statement, but should delineate a completely integrated system. It is the engineer's re-

sponsibility to insure that the dimmer board can be operated by students and does not require a technician just to turn on house lights. All stage boards should be equipped with a panic contactor with remote buttons at selected exits. This contactor will automatically turn on the house lights, regardless of their connection at the stage board plugging panel.

Shops and Manual Training Areas

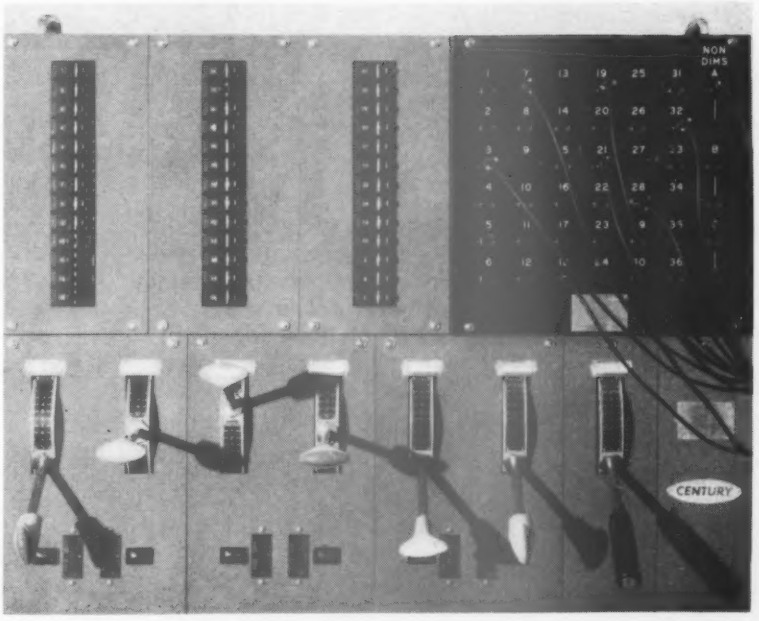
The modern high school or junior high school shop with its many electrically operated machines is best handled as a small industrial plant. By this we mean that the electrical distribution system should be extremely flexible for rearrangement of machines. This is best accomplished with an under floor duct system. Such systems consist of a rectangular metal duct buried in the concrete floor slab and positioned to form a grid covering the entire working area. Outlets of any size and power can be installed at 24-inch intervals along the duct by tapping an appropriate floor fixture. When it is desired to move a machine, the floor outlet is removed and a blank cover plate installed to give a smooth unbroken floor surface.

The other prime requisite for school shops is a means of emergency shutdown. This can be done



Plymouth

This typical stage dimmer board is sized specifically for a well equipped junior or senior high school auditorium. Dimmer handles are on the left; patch panel is on the right.



Dimmer equipment permits a stage to be used to its full limits. A small wall mounted dimmer pack is about the size of an average lighting panel yet adds greatly to auditorium effectiveness.

by placing a contactor in the feeder to the shop panel. The contactor is controlled from emergency shutdown switches strategically located throughout the shop. The shutdown system also serves to disconnect all machines at once at the end of the day's activities.

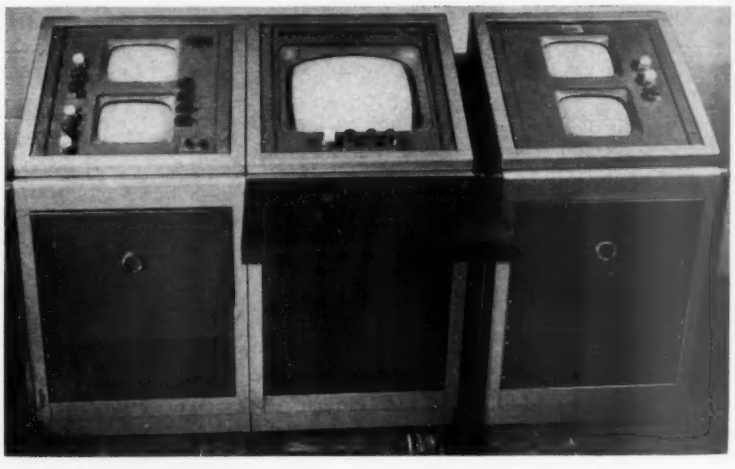
Emergency Light and Power

The handling of emergency light and power is set by local and state authorities in many areas. In general, the emergency lighting system is planned to give the minimum illumination levels for safe exit from a building in the event of a power failure. Emergency electric power can be furnished by battery or motor driven generator sets. It should be remembered that emergency systems, unless they are large expensive generators, will not keep the school in operation during any prolonged power outage. School authorities contemplating the addition of emergency power for new or existing schools should bear this fact in mind when appropriating funds for emergency generators.

The emergency system should be completely automatic, requiring a minimum of maintenance. For battery operated units, our preference is nickel cadmium batteries, because of their long life and low maintenance. For motor generator sets, our preference is diesel liquified petroleum gas operated engines because of the hazards of storing gasoline.

Planning for Expansion

Careful study should be given to the question of future expansion by a building client and the design engineer. The cost of adding spare conduits and several circuit breakers to a main distribution panel is trifling compared to the cost of replacing a service installation to add new classrooms at a later date. Most school authorities know which schools in their districts are most likely to need future additions or site expansion.



Closed-circuit television systems can be operated with a console setup. System at right was installed in the Centereach, Long Island, School System. Controls are few and simple.

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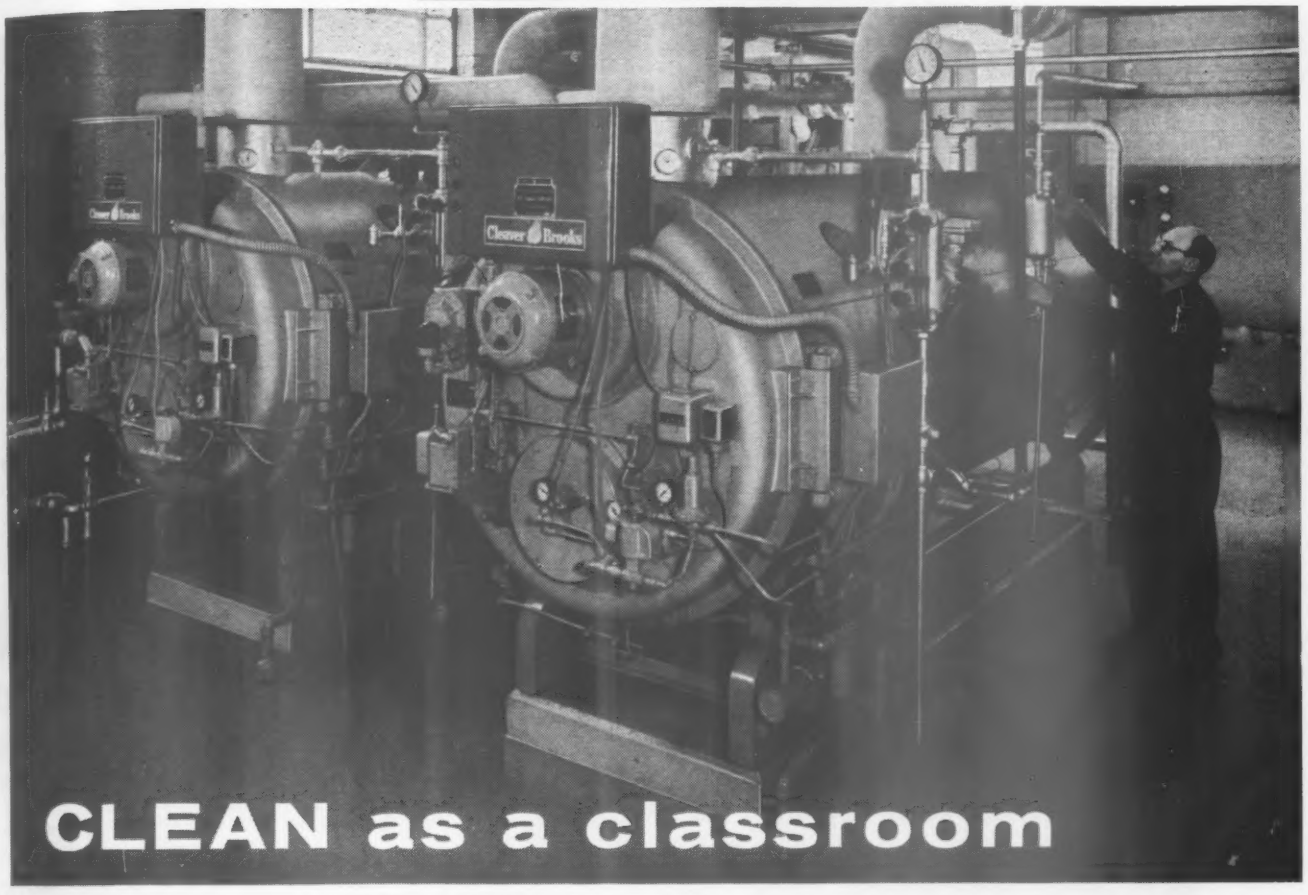

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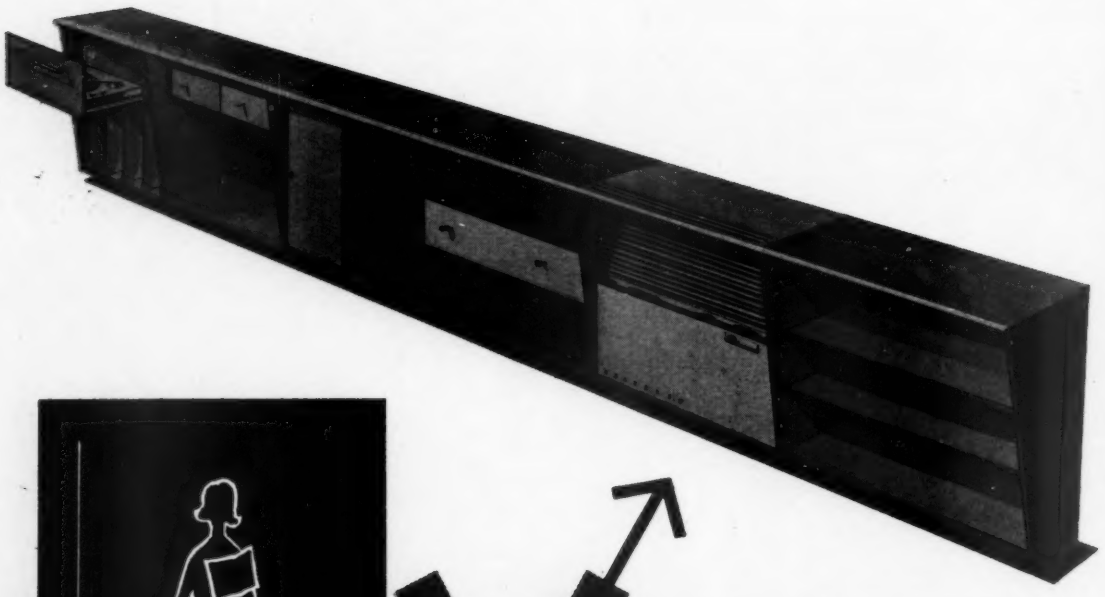

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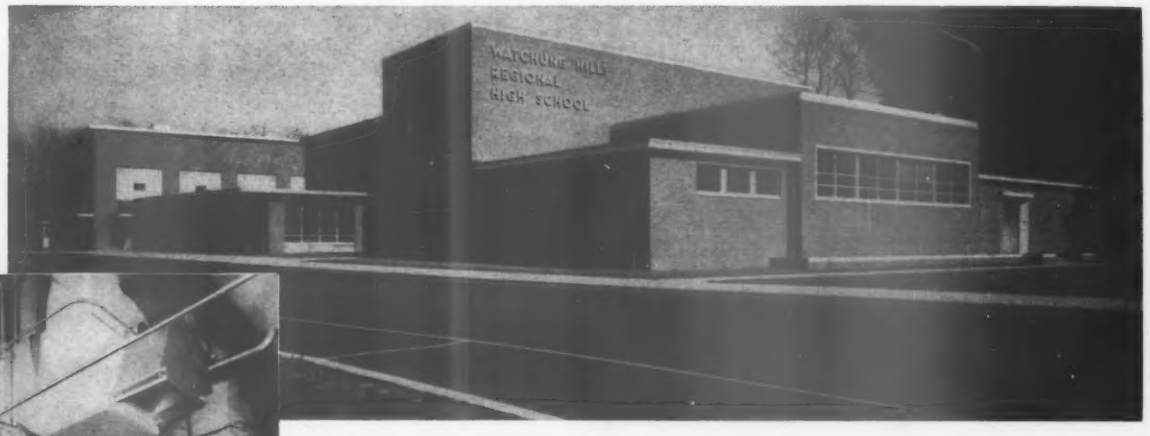
THE INTERNATIONAL BOILER WORKS CO.

200 Birch Street, East Stroudsburg, Pennsylvania



High efficiency is the watchword of simple-to-operate International boilers. All tubes are easily accessible for inspection and cleaning.

WATCHUNG HILLS REGIONAL HIGH SCHOOL

PLAINFIELD, NEW JERSEY

Another Modern School Heated by INTERNATIONAL WATER TUBE BOILERS

All heating requirements of this modern high school are abundantly met by two International low pressure induced draft boilers. Fast-steaming International Water Tube construction quickly satisfies heating loads, even on coldest days.

Join the increasing numbers of schools which depend on longlife International boilers for unexcelled heating service.

3 OUTSTANDING WATER TUBE Package Units by INTERNATIONAL

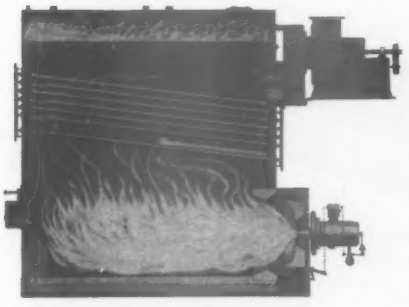
the COAL-PAK AUTOMATIC First FULLY AUTOMATIC package unit complete with combustion controls, automatic coal feed and ash removal system, for burning LOW COST BITUMINOUS COAL cleanly and efficiently. Write for Bulletin 1100.

the COMPAK First FORCED DRAFT water tube package unit with a price tag EQUAL TO OR BELOW firetube scotch package boilers. For low or high pressure requirements, oil or gas fired. Write for Bulletin 1200.

the THERMOJET First FORCED RECIRCULATION package unit that actually requires LESS HEADROOM than modified scotch package boilers. Famous LaMONT boiler design specifically adapted for SINGLE BUILDING low or high temperature water heating systems. Write for Bulletin 1900.

Water Tube Design

. . . the Key to



. . . superior performance

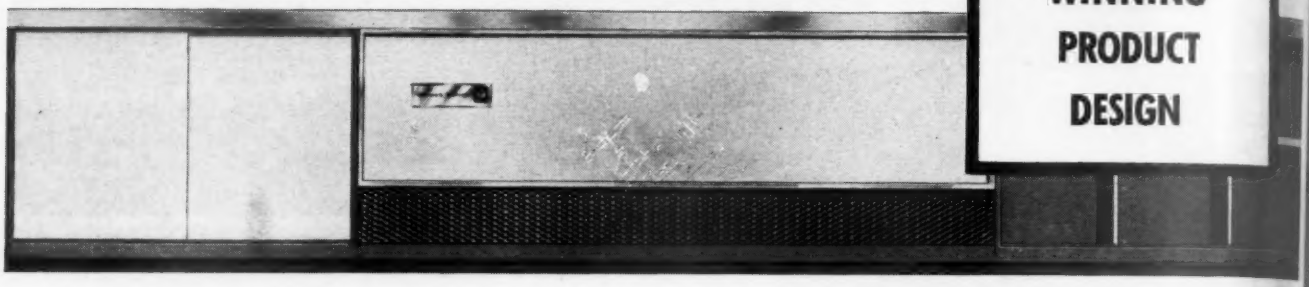
Turbulent three-pass gas flows over banks of inclined tubes, assuring the maximum boiler efficiency and greater fuel economy for which International Water Tube Boilers are noted. Enhancing these characteristics are their large furnace volume and low heat release rates to provide the reserve capacity needed for heavy overloads.

HERMAN NELSON SCHOOL AIR SYSTEMS DIVISION

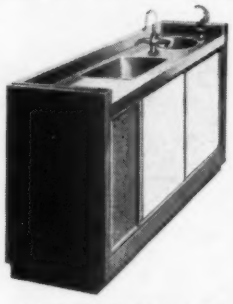
AMERICAN AIR FILTER COMPANY, INC.
215 Central Avenue, Louisville, Kentucky

Herman Nelson offers new architectural styling in classroom equipment!

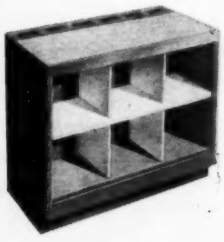
herman nelson
AWARD-WINNING PRODUCT DESIGN



Functional Herman Nelson Window-Wall Companion Equipment

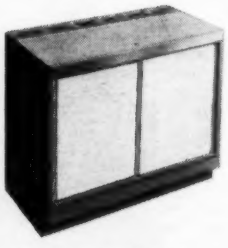


Sink and Bubbler Unit



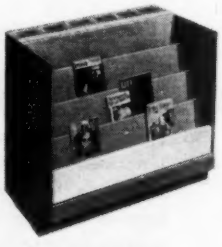
Cubicle Cabinet

Tote Tray Cabinet (10- or 20-trays)



Sliding Door Cabinet

Open Shelf Cabinet



Magazine Rack

Early in 1960, school officials, architects and engineers were introduced to the striking *new* Herman Nelson unit ventilators and companion window wall equipment. And "new" embraces far more than minor model alterations. For example:

AWARD-WINNING DESIGN — Herman Nelson's smart, simple styling was planned specifically to complement advanced school architecture. This new design has won one of Product Engineering magazine's Master Design Awards for Achievement in Product Engineering.

SPACE-SAVING FUNCTION—Companion window wall equipment adds new function and life to under-window areas formerly regarded as "dead space." Companion units (except sink and bubbler and magazine rack) are available in mobile models for convenient desk-to-desk delivery of work materials.

APPEALING ACCENT COLORS—Six beautiful accent colors are offered to complement *any* classroom decor. These colors include Flame Red, Topaz Blue, Kentucky Green, Sunset Yellow, Brushed Orange and Neutral Gray.

PLUS YEAR-ROUND AIR CONDITIONING — HerNel-Cool III Unit Ventilators can be installed now at a cost in the same range as most "heat only" systems. Year-round air conditioning can be installed now—or at any time in the future for only a fraction of the cost of other commercial air conditioning systems.

Send now for your personal copy of the new Herman Nelson "Equipment Guide for Schools." This is a full-color, 24-page booklet describing Herman Nelson equipment for all types of classroom air conditioning, heating, and ventilating systems.

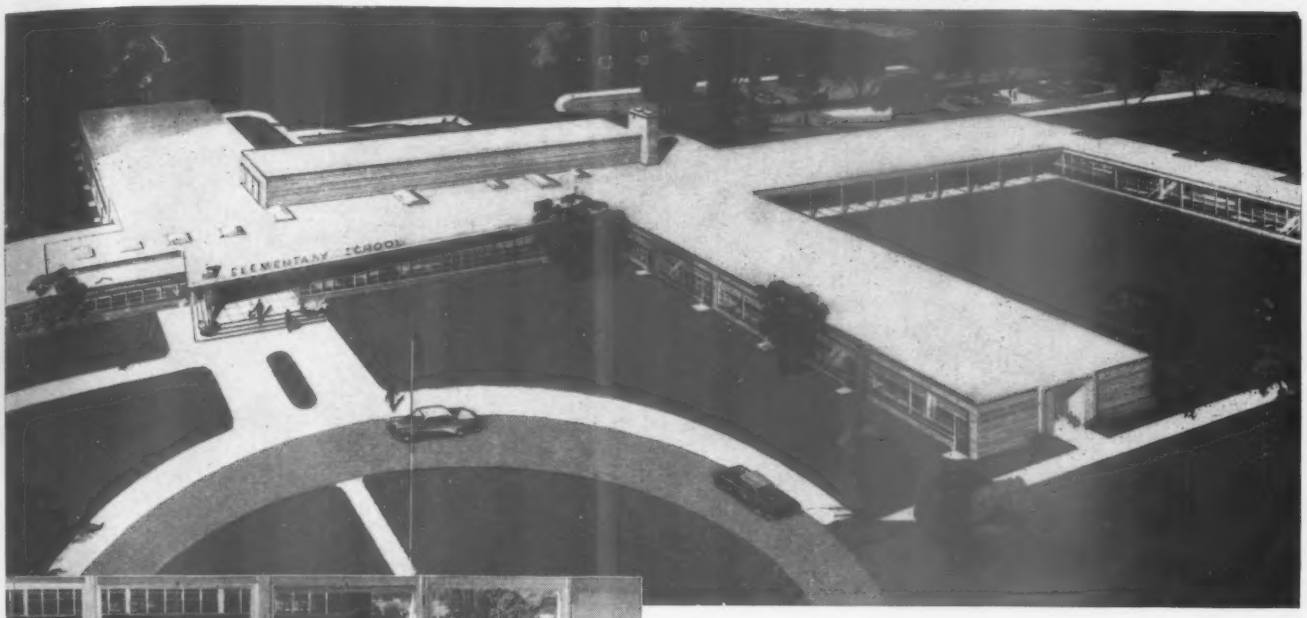
Herman Nelson AAF
SCHOOL AIR SYSTEMS DIVISION
American Air Filter Company, Inc.
215 Central Avenue, Louisville, Kentucky

THE RITTLING CORP.

Rittling Rittling Square, Hamburg, N. Y. Buffalo Area Zone 716, NH 9-4900 Rittling

Representatives in Principal Cities

Manufacturers of Rittling Schoolmaster Unit Ventilators, Area Vents, Horizontal, Vertical and Cabinet Unit Heaters, Industrial Finned Radiation and Enclosures, Sil-N-Wall Radiation, Baseboard Radiation, Cabinet Convectors and Back Draft Dampers



Section of Springville Elementary School, Springville, N. Y.

Architects
Foit & Baschnagel, Buffalo, N. Y.

General Contractors
The John W. Cowper Co., Inc., Buffalo, N. Y.

Heating and Air Conditioning Contractors
G. A. Dyce, Buffalo, N. Y.

With RITTLING SIL-VECTOR Radiation joined to each side of the RITTLING SCHOOLMASTER Unit Ventilator, a curtain of draft-free air warms across the entire window in this classroom.

Rittling Schoolmaster Unit Ventilators

combined with RITTLING Sil-Vector Radiation . . . the Preferred Source for Classroom Comfort

RITTLING SCHOOLMASTER Unit Ventilators and RITTLING SIL-VECTOR Radiation are heating, ventilating, cooling, and filtering both recirculated and incoming air to bring healthful and comfortable climate into hundreds of classrooms. Room air is balanced with incoming air by a blending damper designed for operation with control cycles as set forth by A. S. H. & A. E.

Electrically welded, unitized construction provides structural rigidity and maintains alignment of working parts as well as facilitating installation of piping and adjoining cabinets.

Another result of years of RITTLING research and field experience is *whisper quietness.* Motor and blower speeds, capacities and mountings are specially engineered for quiet operation.

RITTLING SCHOOLMASTER storage cabinets are safe for children, attractive to visitors, and convenient for teachers. Tops and ends with rounded edges are sanitary and durable. Baked-on hard enamel, in choice of colors, conforms to decorative treatment.

For the complete RITTLING SCHOOLMASTER story, write for your copy of Catalog UV-1157.

BRULE INCINERATORS

13918 S. Western Ave., Blue Island, Illinois

Representatives in Principal Cities

INCINERATION SYSTEMS FOR MODERN SCHOOLS

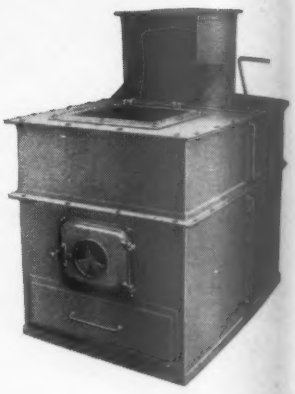
Brule engineers have developed a complete line of trash and waste incinerators for specification in new building plans or economical installation in existing schools.

Brule incineration is safe and economical, and it conserves space. Maintenance is very low because there are no moving parts on a Brule.

BRULE features:

1. Grates, flue sizes, openings, chamber configurations and wall heat gradients are carefully designed to produce high *internal* temperatures exactly where needed for fullest combustion.
2. Flue gases are retained in area beyond fuel bed for clean burning.
3. Firing chamber design assures complete exposure of fuel bed and gases to air, heat and flame.
4. Controlled fresh air assures proper saturation of oxygen.
5. Minimum smoke, soot, fly ash and odor. Performs within all local requirements.
6. Attractive, compact design blends perfectly with most layouts.

Model M-10 All Purpose



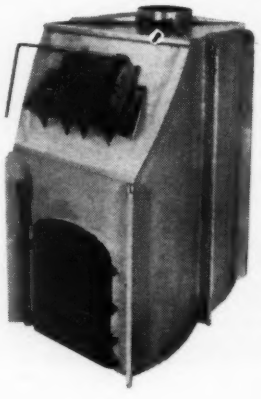
MODEL M-10—Ten bushel charging capacity (1½ drums). Naturally fired; also available with gas or oil burner. Patented three-chamber combustion. Three-inch superior refractory lining. Can be disassembled into two pieces for easier installation. Takes wet and dry waste. Top side loading. Fast burning consumption rate.

Model M-9 Drumful Consumer

MODEL M-7½—Six bushel charging capacity (fibre barrel). Same general features as Model M-9.

MODEL M-9—Eight bushel charging capacity (55 gallon drum). Naturally fired; also available with gas or oil burner. Two chamber combustion. Curtin wall construction with secondary chamber. Three inch commercial refractory lining. Takes wet and dry waste. Top side loading.

MODEL M-5—Ten bushel charging capacity. Same general construction features as Model M-9 except single chamber combustion.

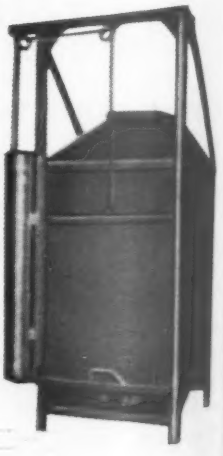


Model GH Garbage Hog

MODEL GH—Ideally designed for disposal of sloppy wastes! Wet waste loaded into front inclined top door is dried on step grates and conditioning shelf, and then consumed through odorless high temperature combustion. Twelve bushel capacity. Heavy cast iron shell lined with heavy duty refractory. Oil, gas or naturally fired. Package model shipped knocked down in panels.

Enclosed Can Washer and Sterilizer

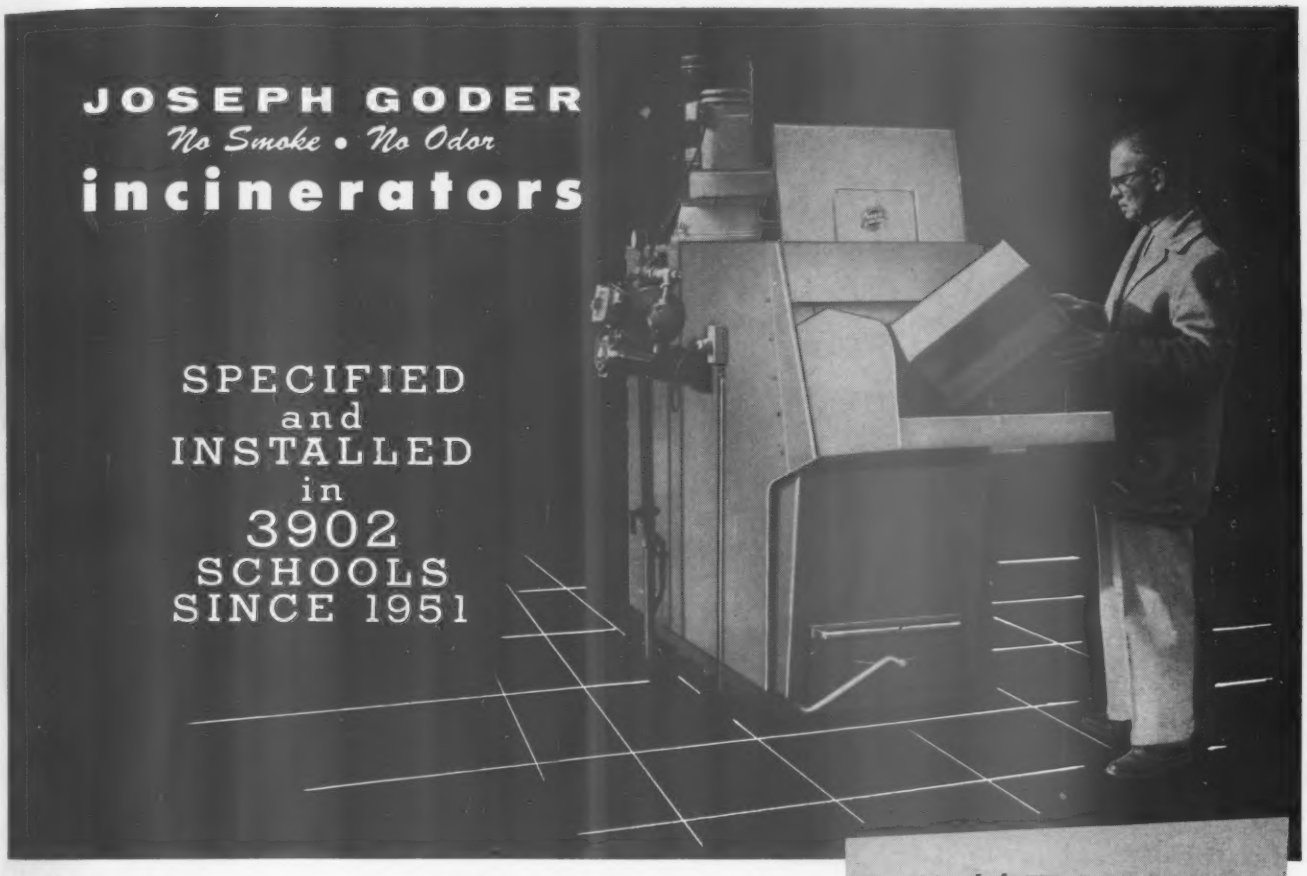
Automatically cleans and sterilizes dirty garbage cans, inside and out. Foot pedal provides any mixture of steam and hot and cold water. Portable unit is quickly connected to existing plumbing lines. Drain pipe carries waste to sewage. Counterweighted guillotine door big enough for largest cans.



Larger capacity incinerators available. Write for complete information.

JOSEPH GODER INCINERATORS

4235 North Honore St., Chicago 13, Illinois



Backed by More Than 50 Years of Know-How!

JOSEPH GODER builds a complete line of efficient, dollar-saving incinerators for complete destruction of every type of building waste, wet or dry, large or small.

Stock models easily adapted to your individual needs. Installed to replace outmoded equipment, amplify present facilities or designed into new construction plans.

ALSO AVAILABLE TECHNICAL BULLETINS ON SCHOOL INCINERATION, FREE WASTE-DISPOSAL SURVEY OF YOUR BUILDINGS

The "Bible" of the Incinerator Industry
Write for your free copy.

See the yellow pages to find the Joseph Goder agent in your area

Model 57-A
DISPOSALL

Reduces 100 lbs. of Waste to a Handful of Clean Ash Every Hour!

No Other Incinerator Gives You All These Features!

- Cyclo-Vane fly-ash collector
- Foot-operated charging door
- Oversize Splash-lip door design
- Kiln-burned firebrick lining
- Continuous-duty operation
- Positive air-pollution control
- Heavy-duty construction

INCINERATORS Joseph Goder NO ODOR

JOSEPH GODER INCINERATORS

Member: Incinerator Institute of America

WORLD'S LARGEST INCINERATOR MANUFACTURERS

N.E.A.
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MORSE BOULGER, INC.

80 Fifth Avenue, New York 11, N. Y.

NEW DESIGNED FOR SCHOOLS "CT" DESTRUCTOR

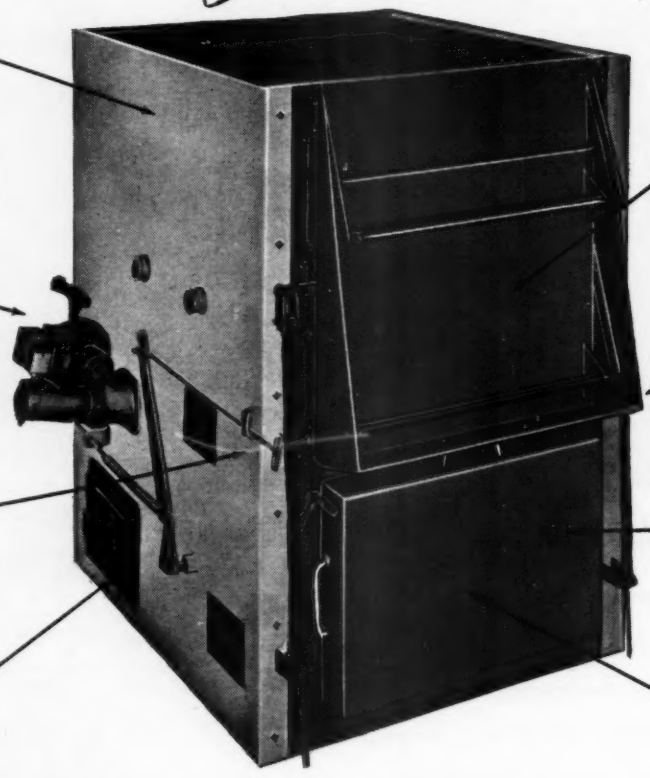
Quality LOW PRICE — NEW FEATURES

Steel Cased
Heavy gage steel casing. Backed with high-heat firebrick backed with newly developed insulation.

Auxiliary Burner (optional)
Gas or oil burner can be used to aid combustion—Placed in combustion or ignition chamber. Includes flame safety devices.

Dump and Shaker Lever
Smooth operating Dump and Shaker Arm for ease of ash removal — No longer need to bend over to clean destructor.

Clean Out Door
Heavy cast iron clean out door with liner for access to combustion and downpass chambers.



"Swing-A-Way" Door
Swings away keeping hot face of door away from operator Smooth operation on heavy duty springs — cannot drop until moved by operator — when open provides large charging access.

Charging Lip
Heavy gage charging lip — set at container height for ease of charging — sloped to allow waste to tumble onto grate area.

Dump Grate
Not shown — Grates do not dump in the conventional method but now dump toward the 'Dorpan' allowing free access to all sections of grate area without difficulties.

"Dorpan"
Combination Ash Door and Ash Pan — Dorpan' hinges at bottom allowing dump grate to deposit ashes directly into ash pan for quick & easy removal of ashes — 'Dorpan' then quickly placed into position and closed.

VARIOUS CAPACITIES FOR SCHOOLS OF ALL SIZES

TYPICAL PURCHASERS INCLUDE:

Boy's Catholic High School	Baltimore, Md.	Northwest Catholic High School	Hartford, Conn.
Colby Jr. High School	Colby, Kansas	St. Luke's R.C. Church & School	Queens, N.Y.
Dewitt Gregier Vocational School	Chicago, Ill.	South Jr. High School	Niagara Falls, N.Y.
Harbor Hill Elementary School	Roslyn, L.I., N.Y.	University of Vermont	Burlington, Vt.
Montana State University	Missoula, Mont.	Westward Expansion Jr. H.S.	W. Palm Beach, Fla.
New Secondary School	Brookville, Pa.	Winchester Jr. High School	Winchester, Mass.

WRITE Dept. 131 or WIRE or CALL COLLECT for FURTHER INFORMATION

MORSE BOULGER, INC.

80 FIFTH AVENUE, NEW YORK 11, N. Y. • WA 9-8000

Member: Incinerator Institute of America; Air Pollution Control Association

Cordley
Since 1889

CORDLEY & HAYES

443 Park Avenue South, New York 16, N. Y.

Specialists in water cooling for more than 70 years

Water Coolers for Every Need

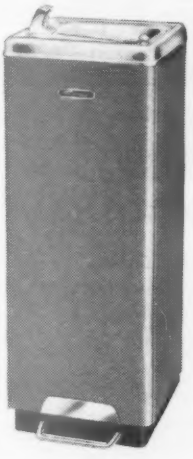
Backed by the Cordley 5-year Guaranty ...most generous in the industry

CORDWALL Floor Models

Require about 25% less space than conventional models. Ideal for corridors. Install flush to wall, recessed (no dirt can get behind) or free-standing. Plumbing connections, made through wall or floor, concealed inside of cabinet. All Cordwall models have both hand and foot controls. Stainless steel top. Gray cabinet. Decorator colors or stainless steel optional. Extra outlets for remote fountains and glass filler. Five models: 6 to 22 gallons per hour.

CORDWALL Off-The-Floor Models

Completely self-contained, conceal all plumbing. Can be mounted at any height, directly on the wall or in recess. Save space. Simplify floor maintenance. Three models: 6, 13 and 14 gallons per hour. Extra outlets for remote fountains and glass fillers. Ideal replacement for existing wall fountains that supply uncooled water.



CORDLEY BUBBLER MODELS Standard and Compact Lines

Capacities from 3 to 27 gallons per hour. Most models have both hand and foot controls and connections for glass filler and remote fountains.

Cordley Bottle-type Coolers

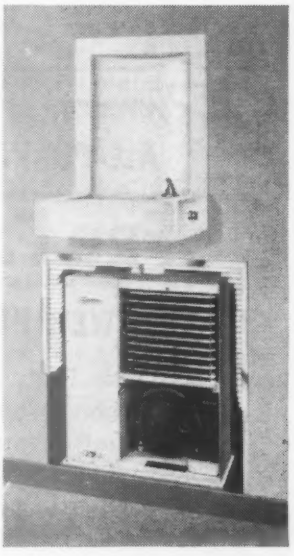
Two models for locations where plumbing facilities are not available.

CORDLEY "WALL-HIDE"

in-the-wall remote coolers. Two models (5 and 10 gallons per hour) only 6¾" deep, to fit in hollow walls of modern architecture.

Other Cordley Remote Type Coolers

In capacities from 6 to 24 gallons per hour, for supplying cooled water to one or more remote fountains.



FIVE YEAR GUARANTY

Entire cooler guaranteed for 5 years against any defect in material or workmanship. If a defect should occur in the hermetic factory-sealed refrigerant system or cooling tank, we will supply a new cooler and pay freight both ways within Continental U.S. and Canada. (Copy of complete guaranty supplied upon request.)

NO OTHER COOLER IS GUARANTEED TO THIS EXTENT!

Write for Catalog on the Cordley quality line of dependable Water Coolers

Cordley Electric Water Coolers are available nationally through plumbing, industrial and other leading supply houses. Consult your classified directory or write Cordley & Hayes.

SYMMONS ENGINEERING COMPANY

445 C St., Boston 10, Mass.

SAFETYMIX

PROTECTS AGAINST SHOWER SCALDS

SAFETYMIX — The pressure-actuated non-scald shower valve is now standard equipment in schools and colleges everywhere. This is because sudden "scalds" in showers are caused only by *fluctuations of pressure*. SAFETYMIX gives positive control over these pressure changes. It is the only non-scald shower valve guaranteed to maintain discharge temperature within 2° F against pressure fluctuations up to 85% in either hot or cold supplies. Costs no more than ordinary valves, is simple to install and is as easy to fix as a faucet.

SOME SAFETYMIX USERS

Michigan State College, M. I. T., Dartmouth, U. of Cincinnati, Johns Hopkins, State Teachers, Wellesley, U. of Chicago, U. of Maine, Brown U., Conn. College, Holy Cross, Leland Stanford, Marquette U., Austing Public Schools, U. of Washington, DePau, Western Reserve, U. of Pittsburgh, Wm. & Mary, Loyola, etc., etc.

Symmons NEW FAIL SAFE TEMPTROL

THERMOSTATIC WATER MIXING VALVE WITH A

REPLACEABLE CARTRIDGE

TEMPTROL accurately maintains constant hot water temperature at outlet regardless of heater temperature variations. Settings range from 90° F to 180° F. The *Replaceable* cartridge (containing all working parts) can be changed by anyone who can handle a screwdriver, *without* removing the rest of the valve from the line. An expert repairman is not required. It instantly and automatically compensates for supply line temperature or pressure changes . . . safely shuts down on hot or cold failure. Easily installed at heater as a Master Control or anywhere along the line as a Zone Control. Corrosion free, stainless construction. Solid fill thermal element mounted out of water in protected chamber. Available in ¾", 1¼", 1½" and 2" sizes. Symmons quality throughout.

Symmons SHOWEROFF

AUTOMATIC SHOWER LIMITER

All parts accessible from front available in either exposed or concealed models with accessories as desired.

SHOWEROFF GIVES YOU:

1. Water Savings
2. Lower H.W. Heating Costs
3. Smaller Supply Tanks
4. Positive Action
5. Easy Installation
6. Dependable Service
7. Symmons Quality

FOR FURTHER INFORMATION WRITE FACTORY DIRECT OR CONTACT NEAREST WHOLESALE PLUMBING DISTRIBUTOR

Symmons NEW ALL-PURPOSE FRE-FLO SHOWER HEAD

Simple, inexpensive, non-clogging unit with adjustable spray and volume control. Specially designed for water of high mineral content. Rigid, theft-proof, polished chrome finish. Famous Symmons quality.

THE HALSEY W. TAYLOR CO.

Manufacturers of Drinking Fountains and Coolers

Warren, Ohio

AGENTS IN PRINCIPAL CITIES

PRODUCTS

Drinking Fountains, pedestal, battery, wall and counter-types. Water Coolers, wall-mounted and floor, bottle and cafeteria types.

DISTINCTIVE FEATURES THAT APPEAL TO ARCHITECTS AND SCHOOL AUTHORITIES

Over the years Halsey Taylor Drinking Fountains have attained an enviable reputation for sanitation, convenience and dependability in installations the world over. They are the most modern you can use for schools, hospitals, hotels, municipal and public buildings, churches and for commercial and industrial specifications. You get health-safety, trouble-free service and exclusive sanitation features, because of automatic stream control and ideal drinking mound.

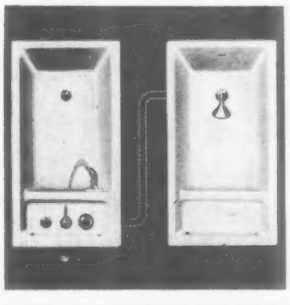
New ALL-CLIMATE Outdoor Fountain

(Patent Pending)

Illustrated is No. 5907, for use where temperatures fall below freezing. Automatic frost-proof valve and drain assembly provide complete drain-back into cabinet in rear of wall. No cutting or fitting required on job. Comes ready for easy installation.

Fountain-Cuspidor Combination

Illustrated is No. 5646 Recessed Fountain with No. 5648 Cuspidor with flushing jet. For room or corridor use. Comes also in semi-recessed models. Furnished with one right and one left hand trap.



The WALL-MOUNT

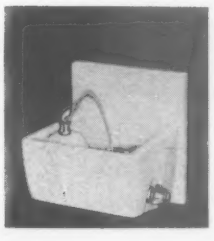
(Patent Pending)

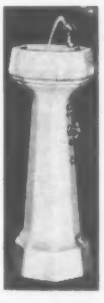
It's a Halsey Taylor first! It mounts on the wall, off the floor. No exposed fittings, no crevices or corners to gather dirt or grime. Compact, easy to clean and keep clean. Saves floor space.

Lo-Level Cafeteria Coolers

This is the original Halsey Taylor Lo-Level cooler. It is ideal for installation wherever small children gather. Comes in a wide range of sizes and can also be had with stainless steel cabinet. All the usual Halsey Taylor health-safety features.

Wall, Pedestal and Battery Types

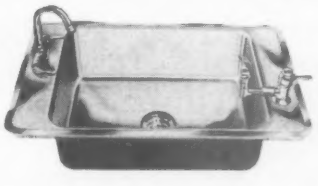




The Halsey Taylor line is replete with streamlined models in two and three part battery wall fountains, as well as recessed and semi-recessed types, and attractive pedestal fountains, in gleaming vitreous china and with ideal hygienic mound-building projector.

Also a full line of new Stainless Steel Wall Fountains & Coolers

Counter-Type Drinking Fountains



Illustrated is No. 5640, with acid-resisting vitreous enameled receptor and stainless steel clamp-down frame. Many other models, all with vandal-proof plumbing connections.

Write for catalog, see Sweet's or Yellow Pages

Halsey Taylor ®

GRINNELL COMPANY
Executive Office, Providence, R. I.
Branch Offices in Principal Cities

This unsprinklered building, housing two laboratories, was completely destroyed by fire. Spontaneous combustion was the suspected cause. Loss was put at $1,000,000.

Why it doesn't pay to experiment with Fire Safety in a college lab

The total number of school fires each year approaches 5000, or almost 13 a day. Among the most frequent places of origin are storage rooms and unused areas; classrooms; auditorium and stage; furnace rooms and laboratories. They start most often through faulty electrical wiring; heating and cooking equipment; smoking and matches; spontaneous combustion.

YOUR SCHOOL CAN BE PROTECTED AGAINST FIRE. Grinnell Automatic Sprinklers stand ready to stop fire — and its threat to life and property — any time, any place. According to records maintained by the National Fire Protection Association (a non-profit, educational organization) there has never been a loss-of-life fire in a school building completely protected by automatic sprinklers.

TYPICAL CASE HISTORIES. MAY 25, 1956 — Children playing with matches started a fire in the Roosevelt High School in Utica, New York. The flames, which spread across joists and sub-flooring, were extinguished by automatic sprinklers.

DECEMBER 6, 1956 — In a large grammar school . . . when the latch on a boiler door failed to hold, hot gases from the flames caused a sprinkler to go into action before any combustible material was ignited.

THE COST OF FIRE VERSUS THE COST OF SPRINKLER PROTECTION. It has been estimated that the cost of installing automatic sprinklers averages between 2% and 4% of the cost of a building. But building construction costs have doubled since 1947. So it is possible to provide complete sprinkler protection for most buildings today for only a fraction of their replacement costs. Moreover, insurance premium reductions are immediate, which helps to pay for the installation.

GET A FREE ESTIMATE. Backed up by over 85 years experience in engineering, manufacturing and installing fire protection systems, our representative can offer you valuable assistance. For example, he will gladly estimate the cost of installing sprinklers in your school. There's no obligation. Get the facts today. Grinnell Company, Providence 1, Rhode Island.

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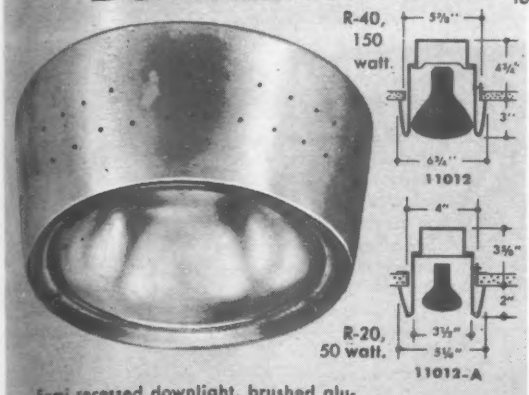
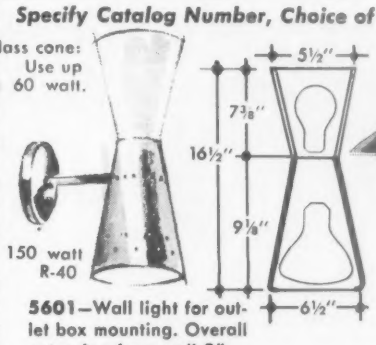
SEMI-RECESSED DOWNLIGHTS



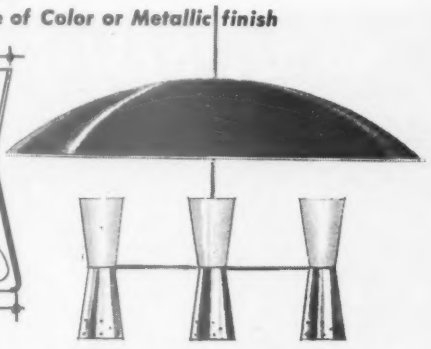
Semi recessed downlight, brushed aluminum, brushed simulated brass, or color. PERFORATIONS EXTRA

Specify Catalog Number, Choice of Color or Metallic finish



5601—Wall light for outlet box mounting. Overall extension from wall 9".

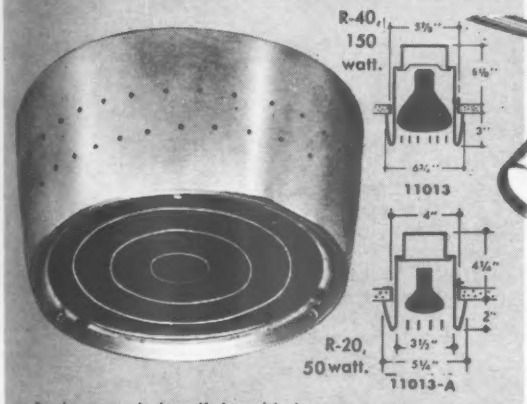
5602—Pin up wall light with 3 way switch and 8 foot cord and plug. PERFORATIONS EXTRA.



5619 Three light ceiling fixture with 36" dia. dome. Overall length 36". Furnished with #88 housings as standard in brushed aluminum finish. Flat white reflecting surface under dome.

Specify with or without decorative Perforations. Domes Available — 24" to 72" dia. Specify whether recessed or pendant mounted.

Available Finishes in Sprayed on Baked Enamel — OYSTER WHITE, WHITE, BLACK, AVOCADO, BITTER GREEN, CARNATION, PEBBLE, PORCELAIN BLUE, SANDALWOOD, SPROUT, TERRA COTTA, WILLOW, CERULEAN BLUE,



Semi recessed downlight with louver. Brushed aluminum, brushed simulated brass, PERFORATIONS EXTRA

TROL-E-DUCT available to specifications

SEND FOR CATALOGS

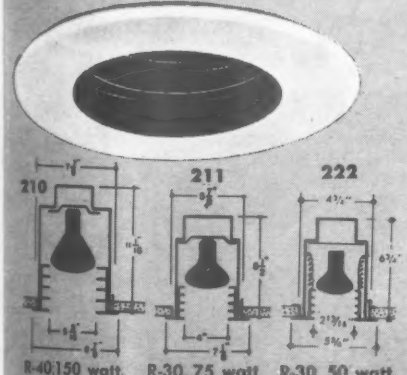
The Trol-E-Duct lighting track is a standardized and prefabricated wiring system that is used in many TV studios where lighting must be flexible.

5723 Four light ceiling fixture with 48" diameter dome. 42" overall length.

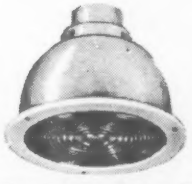
5724 Four light fixture with recessed 48" diameter dome. 26" overall length.

The lighting fixtures on these pages can be furnished as illustrated or used as a point of departure for your designs.

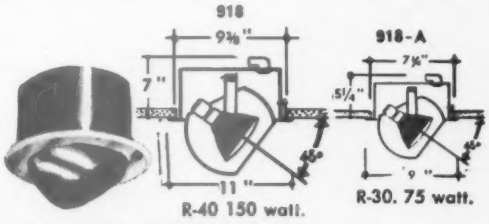
CHERRY, CITRON, DOVE GRAY, DRIFTWOOD, FOREST, FRENCH LILAC, GUNMETAL, HOT CHOCOLATE, LEAF, LEMON PEEL, MUSTARD, NASTURTIUM, and to customers SAMPLES



Recessed baffle downlight . . . for top access add $3.50 extra list. Inside sprayed flat black. Trim sprayed baked on white enamel finish.



Recessed Round Lens Fixtures.
911— 6" Round Lens, 100W.
912— 8" Round Lens, 150W.
913—12" Round Lens, 300W.
Wide spread fresnel lens.
Baked on white enamel door.



Semi-Recessed Adjustable Fixture. Eye Ball Action—360 horizontal adjustment. 45 Vertical adjustment. Baked White trim, Satin Chrome Ball. For use with 150 Watt PAR 38 Reflector lamp.

General LIGHTING COMPANY

Harry Handler

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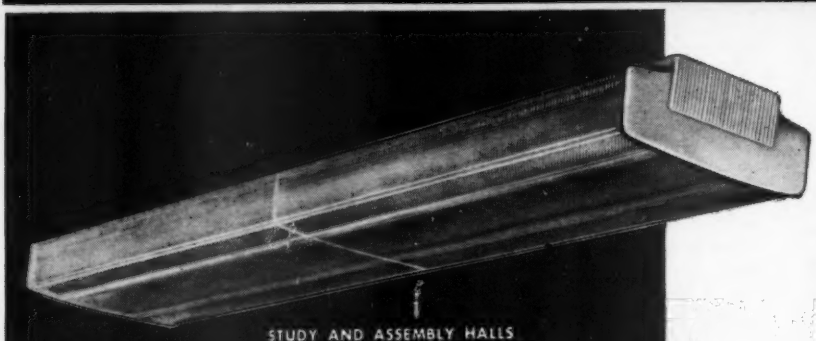

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CLASSROOM – RECESSED
INCANDESCENT

FIELD HOUSES – GYMNASIUMS
LOBAY,® HIBAY® MERCURY VAPOR

CLASSROOM – CEILING
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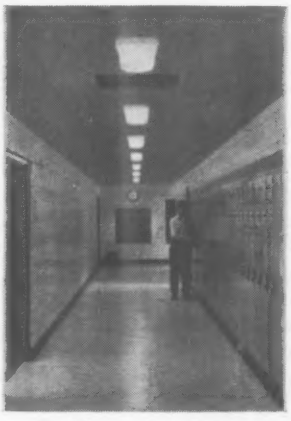
Gymnasium: LOBAY® Units . . . Mercury Vapor

Art Classroom: In-B:lt CONTROLENS® . . . Incandescent

Classroom: Incandescent PARADOME ® Luminaires



Corridor . . . Incandescent

Classroom: REALITE® (Continuous Runs) . . . Fluorescent

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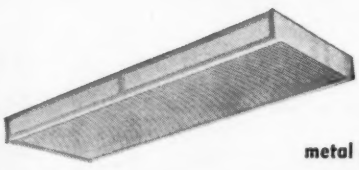

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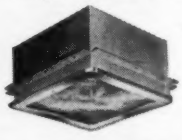
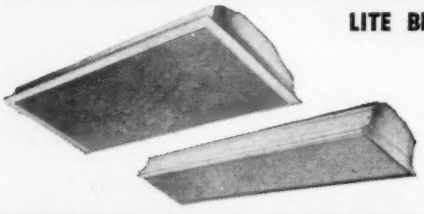
Available in a wide variety of Holophane and Corning lenses with ALZAK and prismatic glass reflectors.



LOOVOLITES

Low-cost recess units with glass louver-lens, open bottoms, or metal louvers. Heat-proof, breakproof ALZAK aluminum reflectors. Many other round recess units.



LITE BLOX RECESSED TROFFERS

1′ and 2′ widths. 8 models fit more than 83 suspension systems. For 1, 2, 3 or 4 lamps. Modular design for unlimited patterns.

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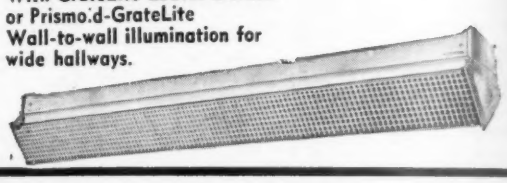
With GrateLite Louver Diffuser or Prismoid-GrateLite Wall-to-wall illumination for wide hallways.



INDUSTRIAL UNITS FOR SHOP AREAS

HIGH & LOW Bay Incandescents

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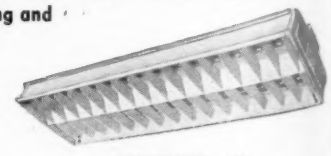
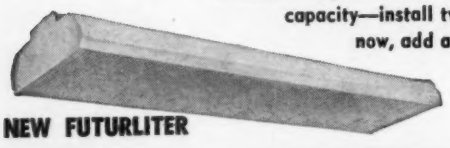


GUTHLITE, JR.

New louvering and diffusing improvements, plus greater latitude in layout. Flexible foot-candle capacity—install two lite rows now, add a third later.



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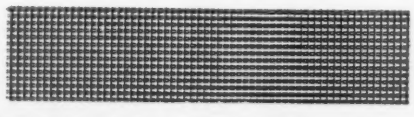
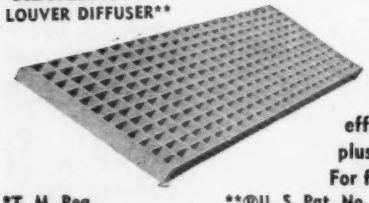
The new, crystal-beautiful prismatic louver-lens. Thousands of plastic prisms create ever-changing light patterns. Breathing action assures better maintenance, cooler operation. Available on many fine Guth luminaires.



PRISMOID-GRATELITE*

GRATELITE
LOUVER DIFFUSER**



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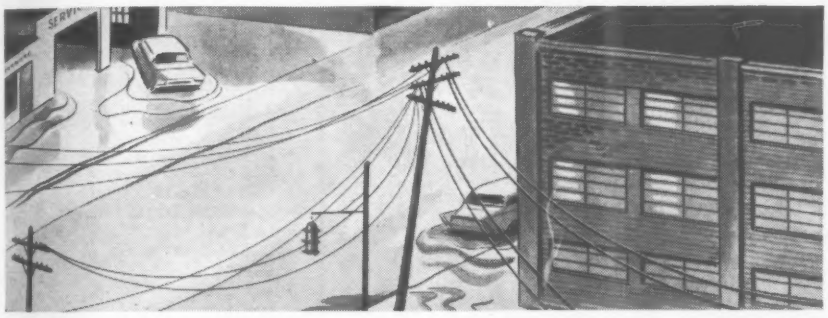
... and injury that can result from sudden darkness. Power failures can come any time. And Exide emergency lighting is your best protection.



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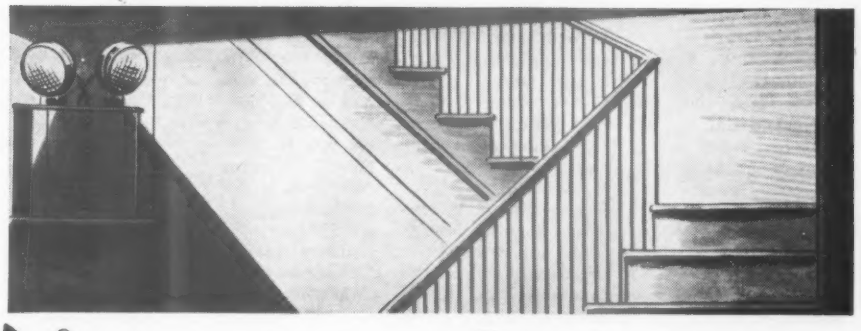
. . . with Exide emergency lighting systems. Powerful Exide batteries wired to regular lighting take over instantly if power fails.



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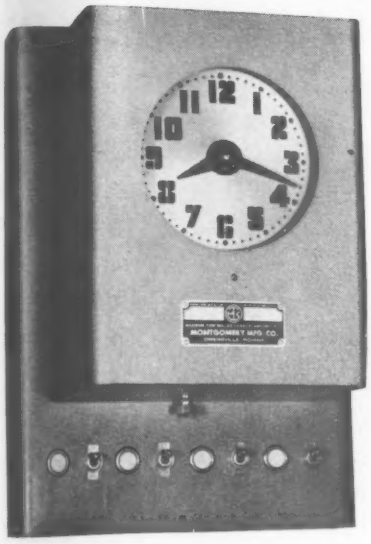

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1 to 6 circuits

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SYNCHRONOUS

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- **regulates signals on days, nights, weekends**
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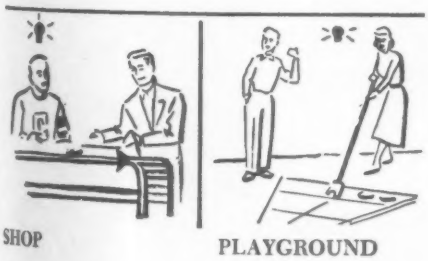
CLASSROOM

GYM



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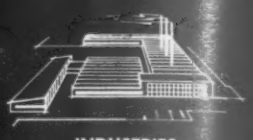
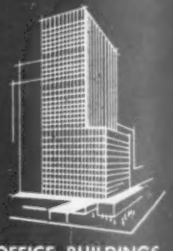


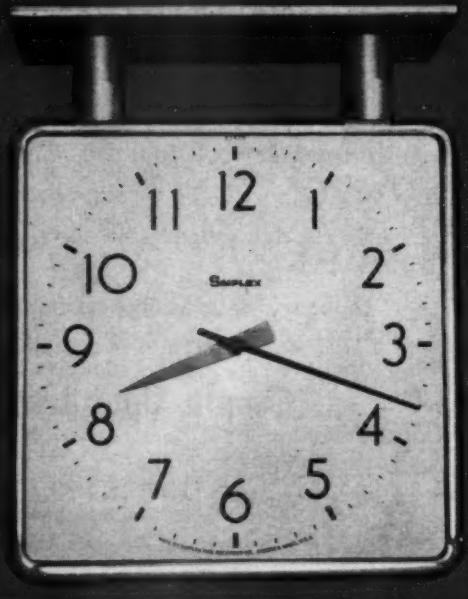
INDUSTRIES

INSTITUTIONS

TRAVEL TERMINALS



OFFICE BUILDINGS



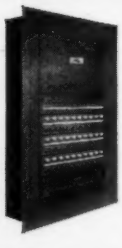
ELECTRONIC

SYNCHRONOUS WIRED

MINUTE IMPULSE

CENTRAL CONTROL SYSTEMS

TIME TONE UNITS



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MASTER CLOCKS

TIME STAMPS

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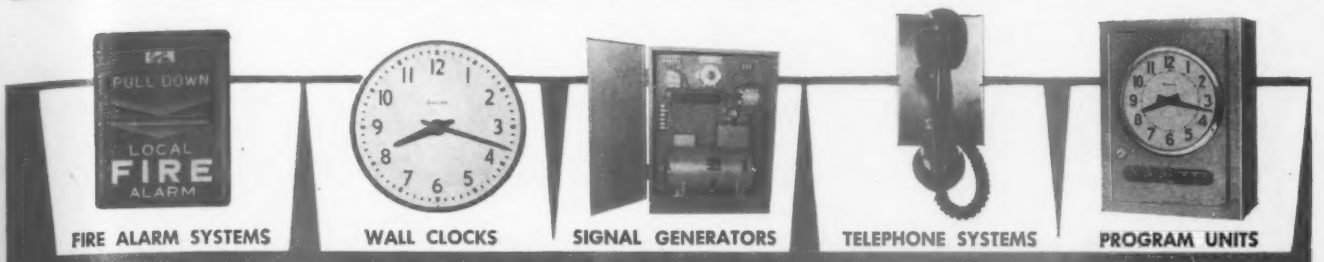

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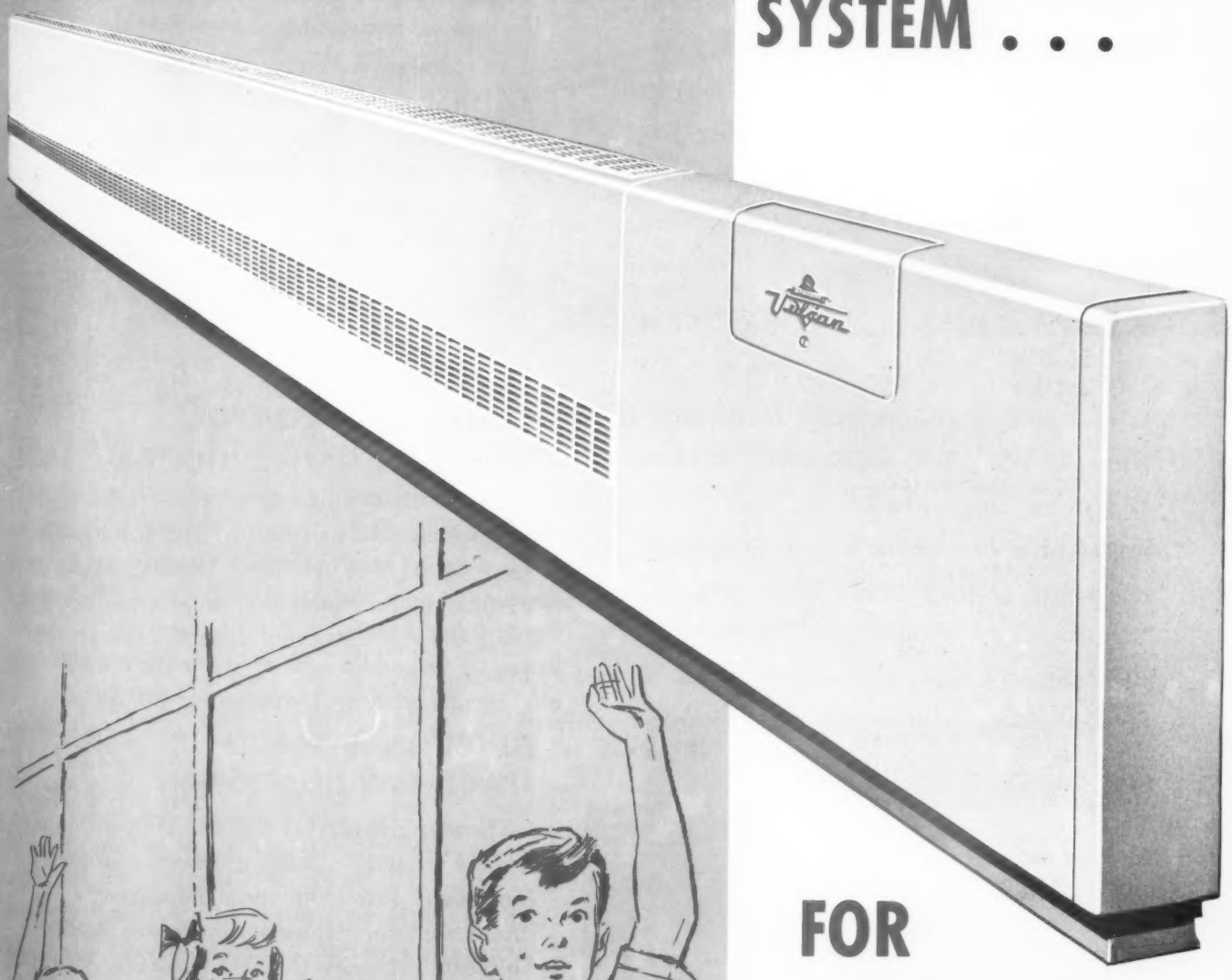
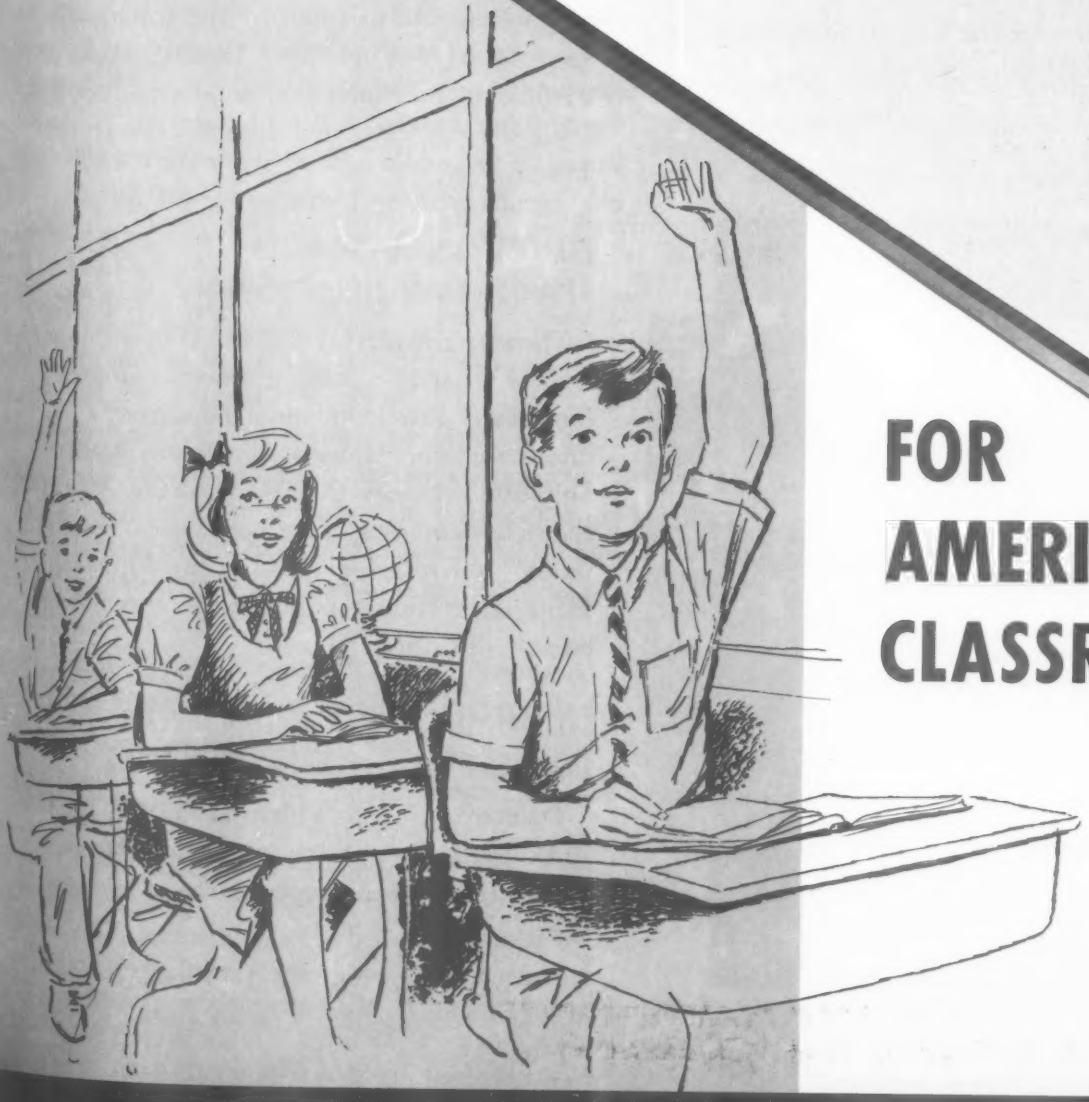


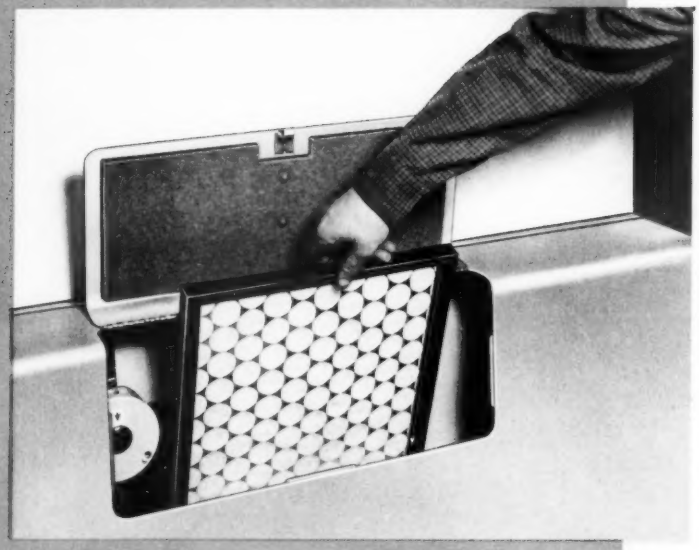


FOR AMERICA'S CLASSROOMS

LINOVENTILATOR . . . Heating-Ventilating System Meets All Requirements At Lowest Cost

The Vulcan LINOVENTILATOR SYSTEM is the latest innovation in classroom heating and ventilating. It has been designed for economy, efficiency and functional beauty, with remarkable savings in installation and operating costs. This has been made possible by unique engineering that introduces an entirely new concept in heating and ventilating.

The LINOVENTILATOR SYSTEM meets the exacting requirements for schoolroom heating-ventilating as established by recognized authorities. **It now places heating-ventilating, heretofore impossible because of high cost, within the reach of local school budgets.**



The only maintenance required is replacement of a throw-away type, chemically treated filter.

A QUALITY SYSTEM AT LOWEST COST

Vulcan LINOVENTILATOR is a quality, low cost schoolroom heating-ventilating system.

New design and advanced engineering have eliminated expensive and complicated dampers, intricate control cycles, and further, have eliminated the need for costly auxiliary radiation to maintain comfortable temperatures, day or night. These cost-saving features constitute an incomparable economy in classroom heating-ventilating systems.

STUDENT - TEACHER HEALTH AND COMFORT

The Vulcan LINOVENTILATOR System meets all the requirements for maintaining an atmosphere which is healthy and comfortable for students and teachers. Heating, cooling, ventilation and elimination of window "downdraft" are efficiently and economically accomplished.

FUNCTIONAL BEAUTY SPACE - SAVING DESIGN

The attractive LINOVENTILATOR enclosure is ideal for architectural treatments. Rounded corners and flush joints throughout create a picture of smooth, molded steel. With a depth of only 6¾", the LINOVENTILATOR System allows for more active classroom space. "Pencil-proof" louvres eliminate student tampering. Here is functional beauty with outstanding economy in space and cost.

ADDITIONAL SAVINGS WITH LOWEST MAINTENANCE COST

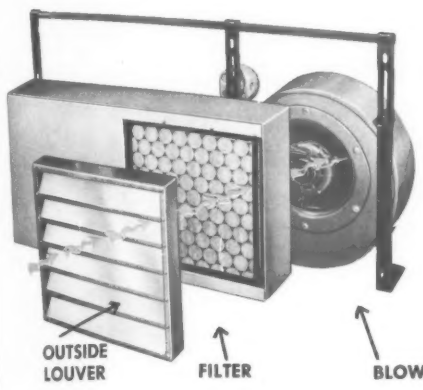
Maintenance of the Vulcan LINOVENTILATOR System has been reduced to the most simple requirement: replacement of fiberglass filter.

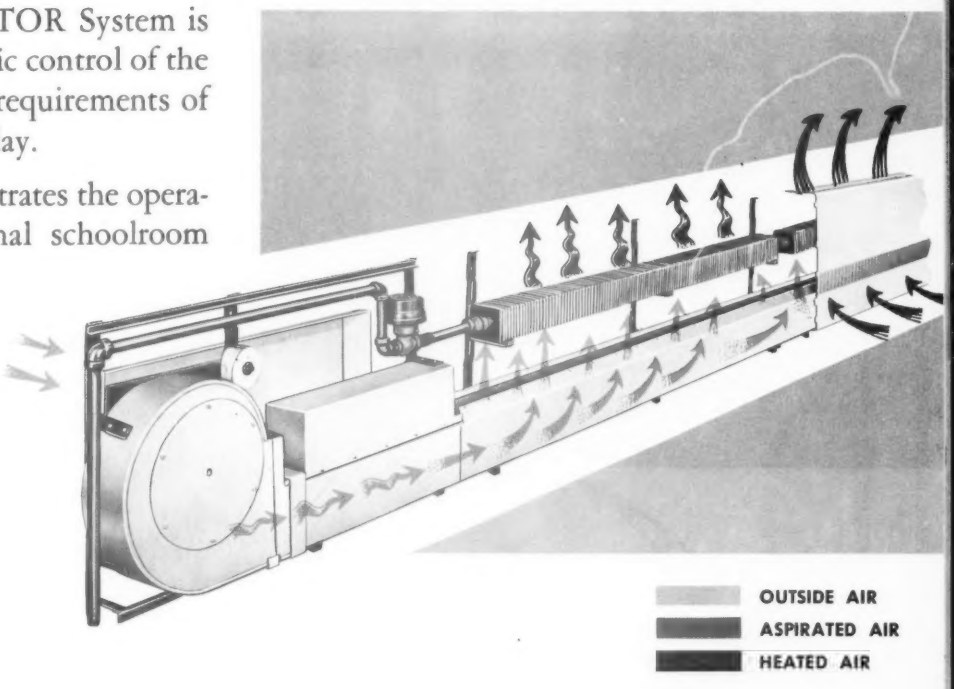
Flush door in power panel provides easy access.

OPERATION OF VULCAN LINOVENTILATOR® SYSTEM

The Vulcan LINOVENTILATOR System is designed to provide fully automatic control of the heating, ventilating and cooling requirements of the classroom during the entire day.

The air flow diagram below illustrates the operation of the system during normal schoolroom occupancy.





DAYTIME HEATING AND VENTILATING

During periods of occupancy, the blower runs continuously to provide necessary fresh air for ventilation. This fresh air aspirates room air as it is discharged through a continuous slot along the entire length of the enclosure. The mixture of fresh air (40-45% total air) and re-circulated room air are passed over the fin tube and heated to maintain uniform room temperature.

NIGHTTIME HEATING

At the end of the school day, the blower can be automatically or manually turned off. Then, classroom heating is provided by natural convection from the Linovector element. Proper temperature is maintained by means of the same control system used during the daytime operation. Thus, comfort conditions are provided for the teacher after school hours, without the necessity of blower operation.

Lower night temperatures, affecting fuel savings, can therefore be maintained under all weather conditions without the need for auxiliary radiation.

MORNING PICK-UP

The high output of Vulcan Linovector elements by natural convection means that the pick-up from reduced night temperatures can be accomplished without the need for blower operation.

Here again, the Vulcan LINOVENTILATOR System provides additional economy by reducing fuel and power costs.

DAYTIME COOLING AND VENTILATING

Often during the day, there is a buildup of heat from the sun, lighting system and body heat; this creates the need for controlled cooling to prevent overheating. The Vulcan LINOVENTILATOR System automatically supplies outdoor air at lower temperature to compensate for this excess heat.

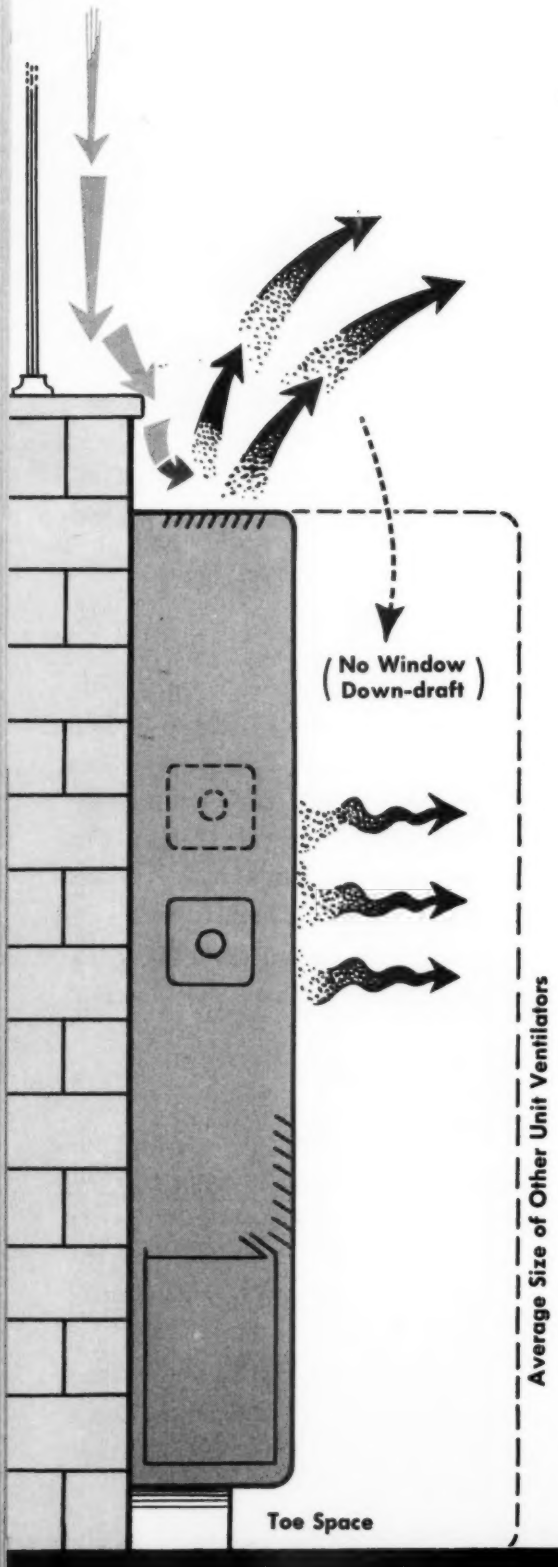
The limit thermostat prevents air from being admitted to the room at temperatures too low for comfort.

UNIFORM LOW VELOCITY AIR DISTRIBUTION

At all times, the Vulcan LINOVENTILATOR System discharges air into the room uniformly over the entire length of the windows at low velocity, which is highly desirable (low velocity minimizes pick up and circulation of dust).

Window "down-drafts", air deflections from lighting fixtures, and the need for directional louvers are eliminated. Uniform temperatures and draft-free comfort are provided throughout the entire classroom by low velocity discharge.

OUTSTANDING COMFORT PERFORMANCE



LINOVENTILATOR ELIMINATES "DOWN-DRAFTS" FROM WINDOWS

One of the serious problems in heating and ventilating is that of window "down-drafts", which causes discomfort to students and teacher. The Vulcan LINOVENTILATOR System completely eliminates "down-drafts" during all phases of its 24-hour operation. The diagram at left illustrates elimination of "down-drafts".

LINOVENTILATOR ALLOWS MORE USABLE FLOOR SPACE

More compact, slimmer, LINOVENTILATOR allows more usable classroom floor space. (Dotted line in diagram shown at left shows the average size of other unit ventilators).

COOLING CYCLE

When heat is not being supplied, but the unit is delivering cooler air, the velocity of discharge is sufficient to intercept the window down-draft and provide a positive barrier against it.

HEATING CYCLE

During the heating cycle, when the fan is on, the air discharges from the outlet grille, picks up the window down-draft mixing it with heated air, re-directing it upwards and out into the classroom. At night, when operating by natural convection, window down-drafts are still intercepted by the heated air discharge.

RADIATED HEAT

Radiated heat loss is another problem created by large window areas, particularly during cold weather. The Vulcan LINOVENTILATOR System provides a continuous source of radiated heat under the windows to offset this loss. This added advantage eliminates the expense of installing auxiliary radiation.

EASY, SIMPLE OPERATION

Reduces Installation and Maintenance Costs

SIMPLIFIED CONTROL SYSTEM

Vulcan LINOVENTILATOR Systems are designed especially to simplify the control system required. No dampers are used in the unit and, hence, only three basic controls are needed: a modulating motorized valve, a room thermostat, and a limit thermostat.

The system is available in two packaged units:

(a) complete with all controls (electric, electronic and pneumatic) factory-installed, furnished by others.

(b) without controls (these can be field-installed).

CONTROL AND SERVICE ACCESS DOOR

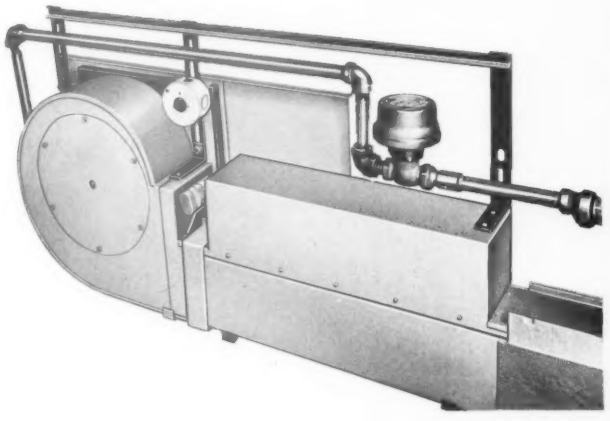
Access to the temperature adjusting dial, the filter and the blower motor for normal adjustment and service is made through a convenient, hinged access door.

NEW CONSTRUCTION

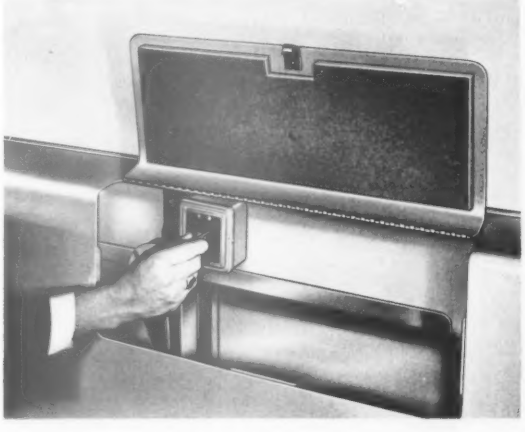
Although designed primarily for schoolroom applications, the LINOVENTILATOR System is equally adaptable to any installation where heating and ventilating are desired: schools, churches, hospitals, offices, laboratories, airports, public buildings and numerous other types of installations.

MODERNIZATION

The LINOVENTILATOR System is ideal for modernization of obsolete facilities and where economical heating and ventilating are required. Installation is simple; relatively little or no structural changes are necessary.



Power unit has simplified control unit.

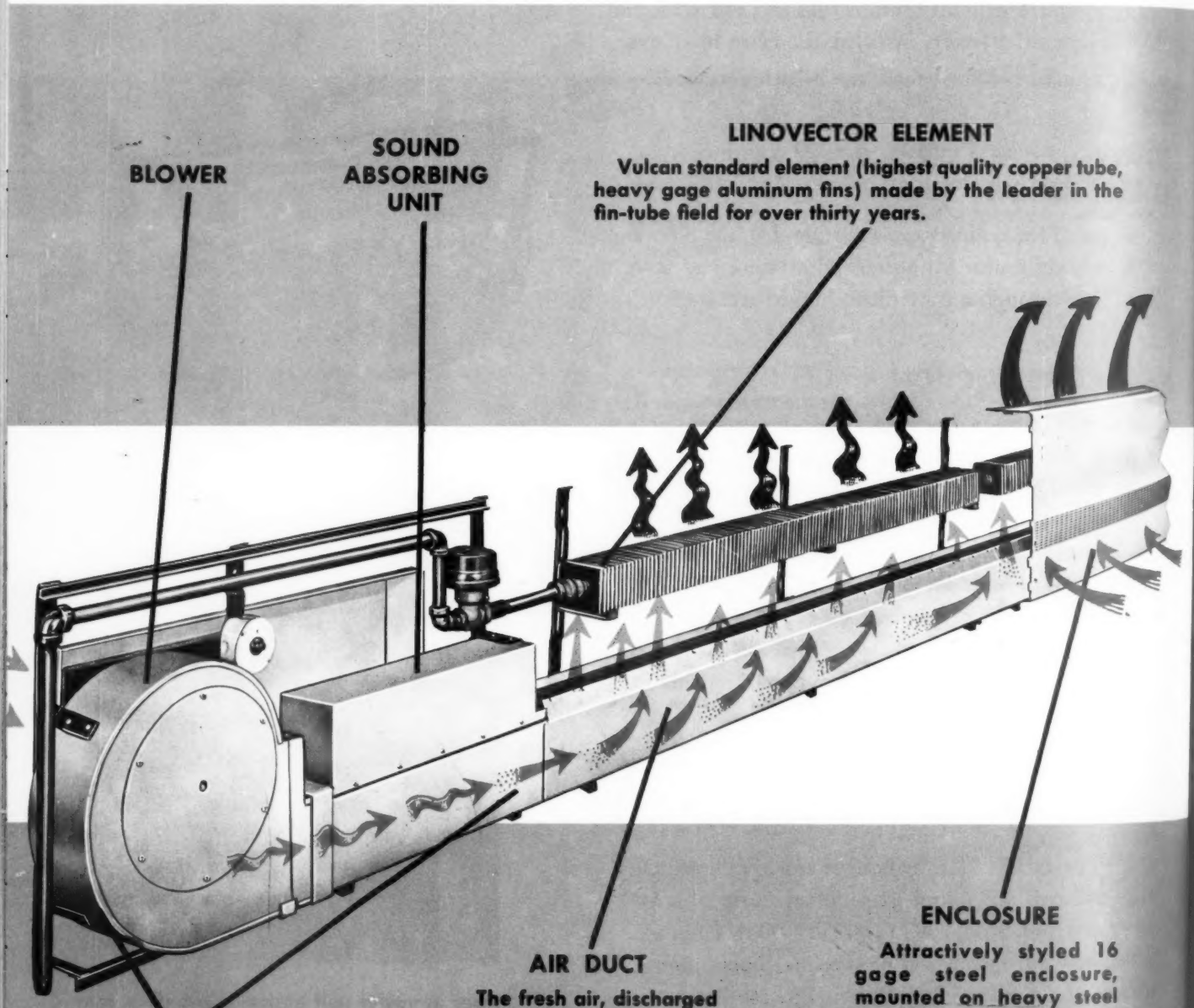


Door in power unit enclosure provides easy access to controls.

SIMPLE, MOST EFFICIENT CLASSROOM SYSTEM

The unique design of the Vulcan LINOVENTILATOR System provides all the requirements for classroom heating and ventilating with the fewest number of parts.

Mixing dampers and complicated control cycles have been eliminated. No auxiliary radiation is required for nighttime operation. Complete blanketing of windows automatically solves the "down-draft" problem. Here for the first time is a highly efficient quality heating-ventilating system at the lowest cost.


BLOWER
SOUND ABSORBING UNIT
LINOVECTOR ELEMENT
Vulcan standard element (highest quality copper tube, heavy gage aluminum fins) made by the leader in the fin-tube field for over thirty years.
POWER UNIT
The factory-assembled power unit consists of blower and sound absorbing unit.
AIR DUCT
The fresh air, discharged uniformly over the entire length along a series of slots, aspirates the return air from the room, completely mixing before passing over the heating element.
ENCLOSURE
Attractively styled 16 gage steel enclosure, mounted on heavy steel support brackets. Provides functional beauty and permanent rigidity. Rounded corners and accessories provided with ample built-in toe space.

VULCAN LINOVENTILATOR UTILITY CABINET

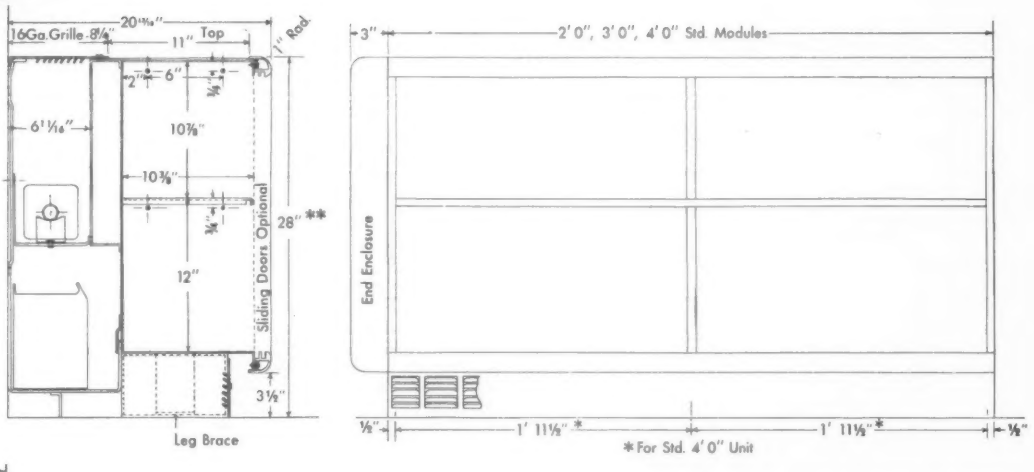
UTILITY CABINETS ALSO AVAILABLE FOR USE WITH VULCAN LINOVECTOR RADIATION IN CLASSROOMS.

Cabinets are available in 2′, 3′ and 4′ lengths, 28″ and 32″ heights, and may be used in various combinations, with or without doors.

Storage shelves will accommodate books and/or supplies up to 12″ high.

The Utility Cabinets are fabricated of 16 ga. steel finished in a choice of 8 standard Vulcan baked enamel colors with matching inlaid Formica tops. (See Vulcan Color Guide.)

For wall-to-wall installations, an additional filler piece is supplied 24″ in length, which may be cut in the field to exact requirements. A rounded end enclosure is provided for installations which terminate short of the walls.



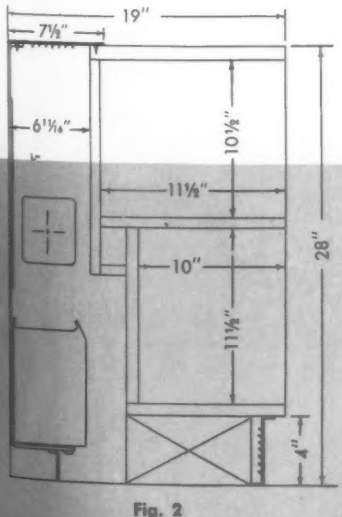


Fig. 2

****FOR LINOVENTILATOR INSTALLATIONS OF OTHER THAN STANDARD 28″ HEIGHT, SPECIFICATIONS FOR UTILITY CABINETS SHOULD BE OBTAINED FROM THE FACTORY.**

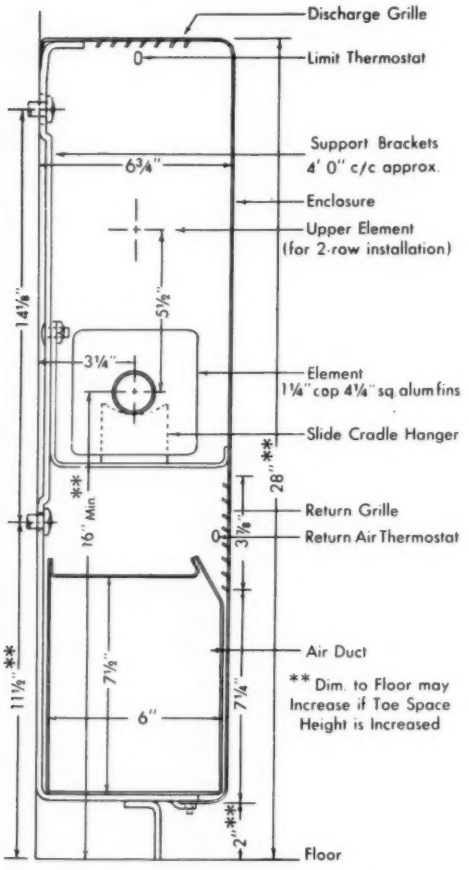
Fig. 1

BUILT-IN ENCLOSURES (by others)

In some instances, architects may wish to specify wood cabinets fabricated by the contractor. The design of such cabinets will naturally depend on individual preference and local conditions. Figure 2 indicates the general dimensional requirements to provide inlet air opening suitable for correct Linoventilator performance. The section of cabinet in front of the power unit should be removable to provide for service access.

The VULCAN LINOVENTILATOR® SYSTEM

SPECIFICATIONS—DIMENSIONAL DATA



NOTE: All flush joints, rounded end enclosures. Dummy Filler Strip available for wall-to-wall installations.

HEATING ELEMENTS

. . . 1¼" Cop. 4¼" square A1. Fins
. . . 32-40-48-60 Fins/ft.
. . . 1 or 2-row high
. . . 12', 16', 20', 24' long
For steam operation, element is equipped with inner distributing tube.

SUPPORT BRACKETS and HANGERS

. . . 3/16" x 1½" heavy steel bracket
. . . approx. 4' center to center
. . . Slide Cradle Hangers

AIR DUCT

. . . 12', 16', 20' or 24' long
. . . Air discharge slot entire length
. . . Furnished in 4' and 8' lengths (installed in the field)

ENCLOSURE

. . . 16 gage zinc-coated, rust-resistant, bonderized steel
. . . 28" high, 6¾" wide
. . . 12', 16', 20', 24' long
. . . louver inlet grille in front
. . . louver outlet grille on top
. . . 2" toe space

POWER UNIT COVER

. . . 4' long, 28" high, 6¾" deep
. . . 16 gage steel with access door provided

BLOWER—MOTOR

Direct Connected

¼HP-1 PH-60C-115V-3.3 Amps.

		R.P.M.
MOTOR	16'-0"	850
	20'-0"	850
	24'-0"	975
	28'-0"	1085

FILTER

14½" x 14½" x 1" Throw Away Type. Chemically Treated.

AIR DELIVERY (Standard Air)

Over-all Length	Blower	Total
16'	300	650
20'	400	880
24'	500	1090
28'	600	1300

CONTROLS—By Others.

For Complete Engineering Data Write For:
The VULCAN LINOVENTILATOR ENGINEERING MANUAL 601-B

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LVM-1-2/61

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- DRINKING FOUNTAINS
- CLASSROOM SINKS

the excitingly new Larco-wall

WALL-SUSPENDED COOLER

An entirely new and different concept in ELECTRIC WATER COOLERS featuring the new ONE PIECE, SUPER HIGH IMPACT STYRENE PLASTIC WRAP AROUND COOLER COVER.

- Eliminates rust and corrosion problems.
- Completely crack-proof - chip proof - scratch proof.
- Eliminates that old style "boxy" look.
- Offers that flowing contour, 3-dimensional contemporary design - no sharp corners.

THE LARCO-WALL FEATURES ..

Flush-to-the-wall mounting - saves space • Off-the-floor-wall mounting - simplifies floor cleaning • Completely concealed plumbing connections inside the cabinet • Stainless steel top designed with deep basin, ribbed stream splitter and back splash flange - protects against wall and floor spotting • Can be mounted at adult or child height • Automatic stream regulated push button bubbler. • Newly improved counterflow type precooler - all copper - hot tin dipped after fabrication • Hermetically sealed Tecumseh compressor with 5 year warranty • Fin and tube forced air condenser - refrigerant metered with trouble free capillary tube. Entire unit covered by 5 year warranty • Dual temperature control - primary adjustable thermostat - **also** secondary fixed limit thermostat offers **double** protection against freeze-up • 3 Quart storage capacity - all copper, refrigerant tubing wrapped around copper tank - **double** wall thickness between drinking water and refrigerant - hot tin dipped - tested for 125 lbs. working pressure • Plumbing connections: ⅜" IPS brass supply - 1¼" IPS brass tail piece • Cooler carrier - for maximum support - use behind-the-wall and under-floor type cooler carrier - model LC-40 (with legs) model LC-50 (less legs) carrier drilled for 40" and 31" basin height • Electrical junction box should be furnished with Eagle #827 (or equal) three prong receptacle.

CAPACITY TABLE

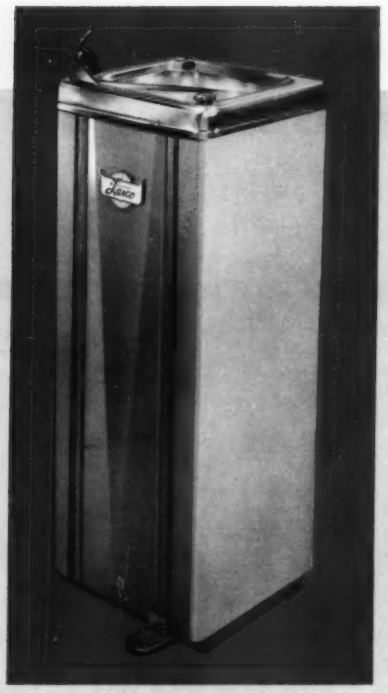
Gallons per hour of 50° drinking water

Inlet Water Temp.	Room Temp.	G.P.H. WA-7 1/5 HP	G.P.H. WA-13 1/5 HP	G.P.H. WA-16 1/4 HP
80°	70	7.8	15.5	18.1
	80	7.4	14.3	16.9
	90	7.0*	13.5*	15.5*
	100	6.3	12.6	14.6

complete catalog furnished on request

CENTURY BRASS WORKS INC., BELLEVILLE, ILL.
LARCO INC., LOS ANGELES, CALIF.

Electric Water Coolers and Chillers



PA MODELS

Standard Floor Mount Pressure Type Coolers LA, PA and XPA Models

Modernly designed pressure type coolers furnished with polished stainless steel top — forged brass CP automatic bubbler — both push button and foot pedal operated — all PA models furnished with full 2 gallon stainless steel storage tank — XPA models are instantaneous, tube on tube type design — cabinet size; 14½" wide, 13½" deep, 39½" high.

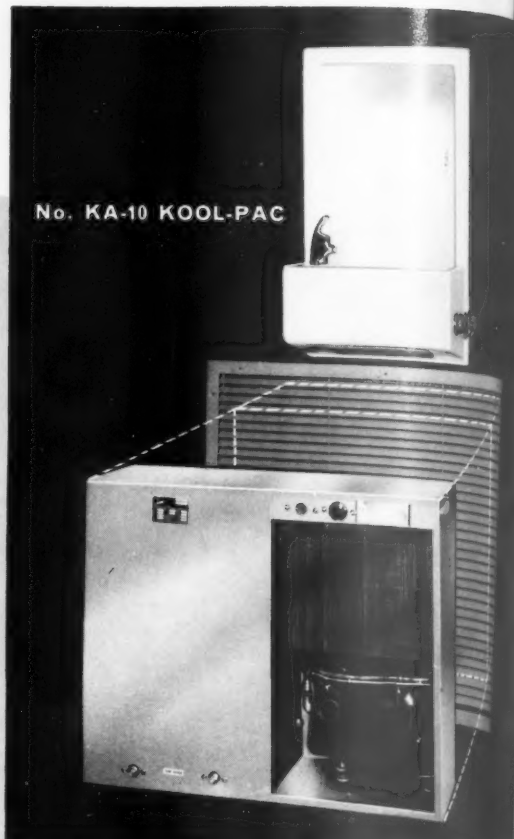
PA-9 meets Federal Specification OOC566C for Type 1 Size 5.

PA-13 meets Federal Specification OOC566C for Type 1 Size 10.

GPH of 80° Drinking Water—80° Inlet—90° Room Temp.

Model Air Cooled	G.P.H. Capacity	Storage Capacity	Unit H. P.	Est. Shipping Weight
XPA-10	10.0	¼ Gal.	1/5	100
XPA-20	19.5	¼ Gal.	1/3	140
PA-9	9.4	2 Gal.	1/5	112
PA-13	12.5	2 Gal.	1/4	130
PA-17	16.3	2 Gal.	1/3	135
LA-4 Kool-Kub	4	2¼ Qt.	1/8	95

XPA models instantaneous type cooling units.
PA models furnished with Stainless Steel Storage Tank.



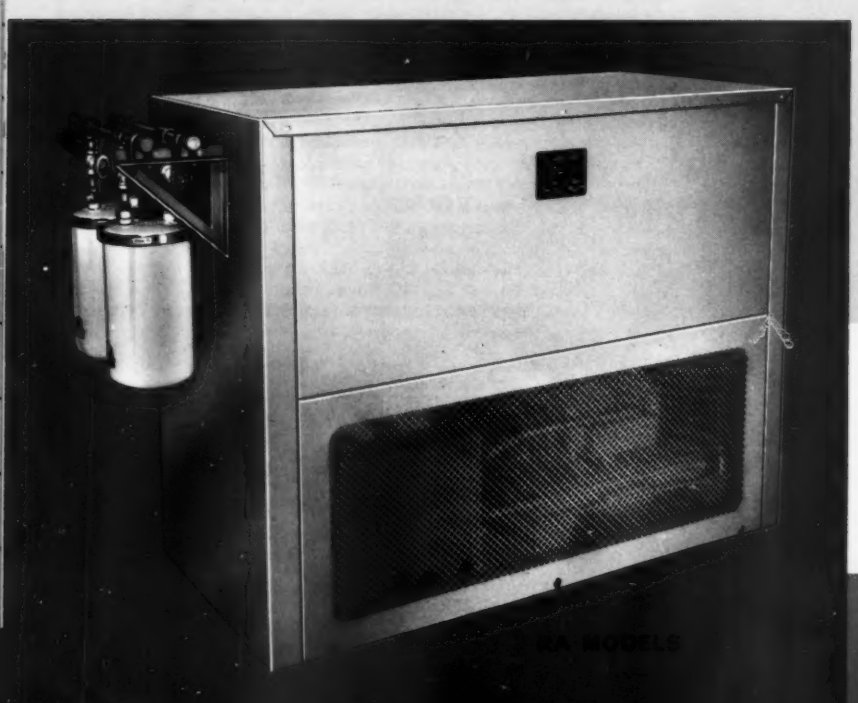
KOOL-PAC

Remote "in the Wall" Type Coolers

The New, Modern Low-Cost Larco Water Cooling Unit for concealed "in-the-wall," or remote installations of all kinds. Eliminates obstructions in corridors, permits that "built-in" trend. A completely packaged self-contained unit. This cooler can also be installed under the counter, in ventilated closets or cabinets, or suspended on wall or ceiling brackets for almost any type installation.

Model	CAPACITY TABLE Ambient Temp. 90°[2] Outlet Temp. 50° Inlet Water Temp. 60°	70°	80°	90°	Unit Size H.P. 115V 60-1	Weights Approx. Net	Ship.	Storage Cap. Gal.	Recomm. Grille Size (Extra)	MAXIMUM OVERALL SIZE Ht.	Width	Depth
KA-5	14.5	8.0	5.0[1]	3.8	1/5	60	95	2	KX-5	23	21⅛	7⅛
KA-6	14.5	8.0	5.0[1]	3.8	1/5	70	100	4	KX-10	23	28⅛	7⅛
KA-10	28.5	15.1	9.9[1]	7.5	1/4	70	100	4	KX-10	23	28⅛	7⅛
KA-15	38.0	20.5	14.0[1]	11.0	1/3	75	105	4	KX-10	23	28⅛	11⅛
KOS-5	14.5	8.0	5.0[1]	3.8	1/5	60	95	1½	KX-5	23	21⅛	6⅛
KOS-10	28.5	15.1	9.9[1]	7.5	1/4	70	100	3	KX-10	23	26⅛	6⅛

[1] Standard rating.
[2] For each 10° rise in ambient temp., decrease capacity 6%. For each 10° temp., increase capacity 6%.
[3] 1" Flange around grille for securing to wall — ALL FOUR SIDES.



RA MODELS

SELF CONTAINED CENTRAL CIRCULATI

MODEL	Outlet Water Temp. 50° GALLONS PER HOUR Inlet Water Temperature at 90° Room Temp. 60°	70° (Fahrenheit)	80°	90°	WEIGHT Net	Shipping	Storage Capacity	Unit H.P.
RA-20	37.4	18.8	*12.5	9.2	285	310	5	⅛
RA-25	52.1	26.1	*17.3	13.0	300	325	13	⅛
RA-30	84.0	42.5	*28.5	21.4	400	430	20	¼
RA-50	168.6	82.5	*50.0	41.4	547	632	25	⅓
RA-75	209.6	104.8	*69.6	52.2	772	907	40	½
RA-100	292.0	146.0	*98.0	74.0	950	1250	50	¾
RW-200	600.0	280.0	*200.0	148.0	1800	2200	100	1
RW-300	900.0	420.0	*300.0	220.0	2600	3000	150	1½

*Standard Rating.
Recovery capacity on water cooled model approximately 20 - 25% greater.
Remote Models RA-20, RA-25 and RA-30 only, are UL tested.

CENTRAL CIRCULATING CHILLERS

The modern trend of efficiently and economically supplying chilled outlets —

Saves spave — costs less to install and operate — minimizes enhances modern architectural designing — silent and dependable Larco central chillers can be "custom engineered" to meet any design — CONTACT OUR ENGINEERING DEPARTMENT. Details furnished on request.

NOTE: Contact our Engineering Department for written specifications and detailed

Cafeteria Type Coolers

PAC MODELS

Heavy duty, high capacity "combination" type coolers designed for cafeteria, restaurant, school and industry — full 5 GALLON STORAGE TANK (galvanized steel or Everdur) to handle "PEAK LOAD" demand — polished stainless steel top with choice of four bubbler-glass filler arrangements, all foot pedal operated — cabinet furnished in baked enamel or complete stainless steel finish. Can be furnished in "Jr." size, 30 inch height (specify PAC-J).

Outlet Water Temp. 50°	GALLONS PER HOUR Inlet Water Temperature at 90° Room Temp. (Fahrenheit)				WEIGHT				OVER-ALL MEASUREMENTS (Inches)			PIPE (I.P.S.) (Inches)	
MODEL	60°	70°	80°	90°	Net	Shipping	Storage Capacity	Unit H.P.	Depth	Width	Hght.	In.	Out
PAC-15	30.1	21.4	*14.5	10.8	250	280	5	⅛	20	29	39	½	1¼
PAC-20	42.8	25.4	*19.5	17.2	255	285	5	⅓	20	29	39	½	1¼
PAC-25	54.0	33.0	*24.5	21.0	255	285	5	½	20	29	39	½	1¼
SR Size 30" Height													
PAC-J-15	30.1	21.4	*14.5	10.8	240	270	5	⅛	20	29	30	½	1¼
PAC-J-20	42.8	25.4	*19.5	17.2	245	275	5	⅓	20	29	30	½	1¼
PAC-J-25	54.0	33.0	*24.5	21.0	245	275	5	½	20	29	30	½	1¼

Can be furnished with water cooled condensing unit (PWC and PWC-J).

PAC models

CA MODELS

One of the finest of all cafeteria coolers — MODERN — EYE APPEALING — EFFICIENT — STURDY — DEPENDABLE. Equipped with galvanized steel (or Everdur) storage tanks ranging from 5 to 40 gallons capacity — assures AMPLE PEAK LOAD capacity — Equipped with two push back type glass fillers assembled to stainless steel back plate and drip tray. Cabinet furnished in baked enamel or complete stainless steel finish.

Outlet Water Temp. 50°	GALLONS PER HOUR Inlet Water Temperature at 90° Room Temp. (Fahrenheit)				WEIGHT				OVER-ALL MEASUREMENTS (Inches)			PIPE (I.P.S.) (Inches)	
MODEL	60°	70°	80°	90°	Net	Shipping	Storage Capacity	Unit H.P.	Depth	Width	Hght.	In.	Out
CA-20	37.4	18.8	*12.5	9.2	285	310	5	⅓	25½	30	53	½	1¼
CA-25	52.1	26.1	*17.3	13.0	305	330	13	½	25½	30	53	½	1¼
CA-30	84.0	42.5	*28.5	21.4	405	435	20	¾	25½	40	53	½	1¼
CA-50	168.6	82.5	*55.6	41.4	550	635	25	1½	27½	60	53	½	1¼
CA-75	209.6	104.8	*69.6	52.2	775	910	40	2	27½	60	68½	¾	1¼

*Standard Rating.
Can be furnished with water cooled condensing unit (CW).

CA models

PAS MODELS

The new SLIMLINE restaurant-cafeteria type cooler — exclusive add-a-shelf design — counter height — only 16" wide — full 5 GALLON galvanized steel (or Everdur) storage tank to handle PEAK LOAD demand — stainless steel top — cabinet furnished in baked enamel or complete stainless steel finish.

MODEL Air Cooled	Gallons Per Hour Capacity	Storage Capacity	Unit H.P.	Est. Shipping Weight
PAS-9	9.5	5	1/4	245
PAS-13	12.5	5	1/3	270
PAS-17	17.0	5	1/2	308
WATER COOLED				
PWS-9	12	5	1/4	245
PWS-13	16	5	1/3	270
PWS-17	21	5	1/2	308

Cabinet: 16⅛" Width, 22" Depth, 35⅛" Height.

PAS models

HL MODELS

Versatile "Hi-Lo" cooler can be furnished with glass fillers for cafeteria service or with bubblers service, or both — "Hi" service for adults — "Lo" service for child height — ample galvanized steel (or Everdur) storage tank for PEAK LOAD demand — baked enamel or complete stainless steel cabinets.

Outlet Water Temp. 50°	GALLONS PER HOUR Inlet Water Temperature at 90° Room Temp. (Fahrenheit)				WEIGHT				OVER-ALL MEASUREMENTS (Inches)			PIPE (I.P.S.) (Inches)	
MODEL	60°	70°	80°	90°	Net	Shipping	Storage Capacity	Unit H.P.	Depth	Width	Hght.	In.	Out
HL-20	37.4	18.8	*12.5	9.2	285	310	5	⅓	25½	30	47	½	½
HL-25	52.1	26.1	*17.3	13.0	300	325	13	½	25½	30	47	½	½
HL-30	84.0	42.5	*28.5	21.4	400	430	20	¾	25½	40	47	½	½

Can be furnished with water cooled condensing unit (HLW).

HL models

CENTURY

DRINKING FOUNTAINS

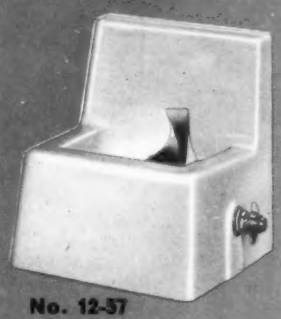
VITREOUS CHINA WALL FOUNTAINS

. . . with elevated bubbler base

A complete line of modernly designed vitreous china single wall hung drinking fountains with approved elevated bubbler base design—furnished with #701 automatic stream regulated bubbler head, self closing valve, ⅜" IPS brass supply, loose key stop, brass c.p. strainer, 1¼" IPS brass tail piece. (Trap optional)

DIMENSIONS	No. 7-45	No. 7-48	No. 12-57	No. 9-50
Receptor (Inside)	9 x 9¼ in.	12 x 10 in.	10½ x 9 in.	10½ x 10 in.
Depth of Receptor	2¾ in.	3 in.	3 in.	2½ in.
Width Over All	13 in.	15¼ in.	16 in.	12 in.
Height Over All	10½ in.	26⅛ in.	16½ in.	8¾ in.
Wall to Drinking Stream	9 in.	4½ in.	11 in.	10½ in.
Wall to Front of Fountain	13 in.	7 in.	14 in.	12½ in.
Shipping Weight	43 lb.	75 lb.	50 lb.	25 lbs.

No. 7-45



No. 12-57

MULTIPLE BATTERY FOUNTAINS

. . . with elevated bubbler base

Acid resisting, enameled cast iron and vitreous china multiple battery fountains, with 2, 3, or 4 No. 701 automatic stream regulated bubblers, self closing valves, ⅜" IPS brass supply, loose key stop, brass c.p. strainer, 1¼" IPS brass tail piece. (Trap optional)

DIMENSIONS	11-68-3 Cast Iron	No. 7-40-A Vitreous China	No. 7-67-4 Cast Iron
Depth of Trough	2 in.	3½ in.	2½ in.
Wall to Drinking Stream	10 in.	9 in.	8 in.
Wall to Front of Fountain	12¾ in.	13 in.	11 in.
Height at Back (Over All)	8 in.	7½ in.	
Number of Bubblers	1 2 3	2	2 3 4
Width	18¾ in. 32 in. 46 in.	25 in.	30 in. 44 in. 55 in.
Shipping Weight	69 lb. 93 lb. 120 lb.	55 lb.	75 lb. 85 lb. 120 lb.

No. 11-68-3

7-40-A

7-67-4

STAINLESS STEEL FOUNTAINS

A complete line of stainless steel drinking fountain fixtures, fully and semi recessed, single wall hung units. Furnished complete with automatic bubbler, self closing valve, ⅜" IPS supply, 1¼" waste fittings. (Trap optional)

No. 7-51

No. 7-53

CLASSROOM SINKS

No. 3000

Both stainless steel and acid-resisting enameled iron [illegible] sinks available with a variety of bubbler-valve and [illegible] fittings, brass c. p. strainer and tail piece connections optional)

complete catalog furnished on request

CENTURY BRASS WORKS INC.

CENTURY BRASS WORKS INC.
1100 North Illinois Street
Belleville, Illinois

LARCO INC.
2409 San Francisco Road
Los Angeles 65, California

Filtrine

WATER COOLERS & FIXTURES FOR SCHOOLS

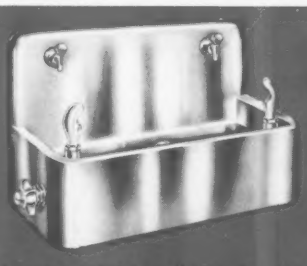
Model 102

16 g. #304 s/s with ... glass filler (optional); ... regulator; 1¼" ... ¼" FPT supply. Pro-

Model 101-D

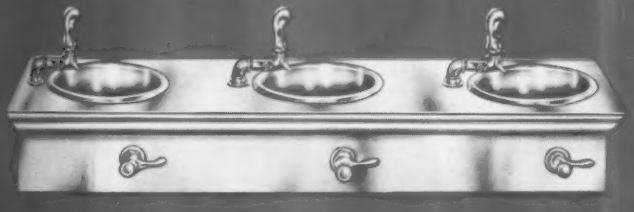
Semi-recessed, 16 g. #304 s/s with 2 bubblers; 2 glass-fillers (optional); adjustable "auto-flo" regulators; 1¼" O.D. tailpieces; ¼" FPT supply. Projection 6".

...receptor fountain, 16 g. ... bubbler, adjustable ... regulator. All piping con... ½" supply ¼" sweat.



Model 101-D

Non-recessed, 16 g. #304 s/s with 2 bubblers; 2 glass-fillers (optional); adjustable "auto-flo" regulators; ¼" O.D. tailpieces; ¼" FPT supply. Projection 11½"
Also available single — Model 101 — as above

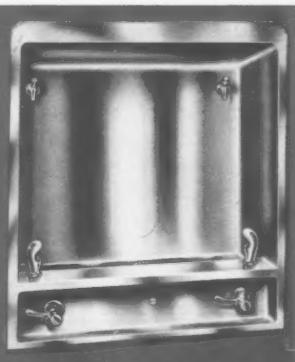


Model 100-T

...ge fountain of hand-polished, satin-finish, 16 g. #304 stainless steel with ... and recessed bowl receptors, especially suitable for schools. Each receptor with ... to prevent run-over. Also available with single bubbler — Model 100; also with 2 ... Model 100-D. Projection, all models, 11".

Model 106

...rcut china with re... ...board apron; 1 bub... (optional); adjust... regulator; 1¼" O.D. ... supply. Projection



Model 103-D

Fully recessed, 16 g. #304 s/s with 2 bubblers; 2 glass-fillers (optional); adjustable "auto-flo" regulators; 1¼" O.D. tailpieces; ¼" FPT supply. Also available single — Model 103 — as above but with 1 bubbler, 1 optional glass-filler.

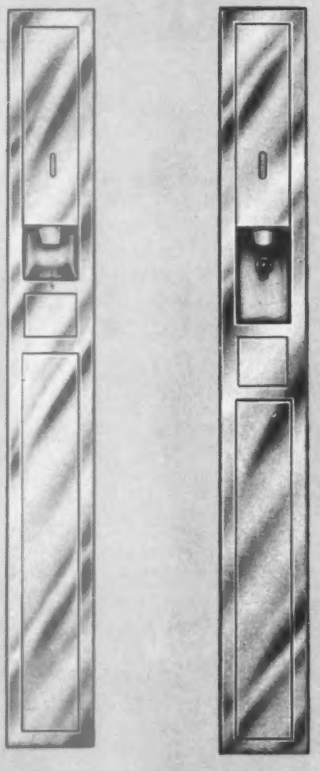
FILTRINE MANUFACTURING COMPANY

STAINLESS STEEL WALL FOUNTAINS

In hand-polished, 16 g. #304 stainless steel "INDESTRUCT" fountains impart a new note of beauty . . . a touch of tomorrow in the buildings of today.

Designed with classic simplicity to blend with the finest modern interiors, the lustre of "INDESTRUCT" adds distinction to any corridor remains impervious to hard usage, keeps its beauty and modern appearance through the years. It will not chip, crack, stain or become outdated after future remodelling.

NEW STAINLESS STEEL DISPENSER-DISPOSAL UNITS



Again Filtrine presents an architect-inspired innovation to bring new and practical beauty to the buildings of today and tomorrow!—

Model Ac-31a Dispenser-Disposal Unit (Left)

Fully recessed cup dispenser and disposal unit in 16 gauge #304, satin-finish stainless steel. Concealed cup-storage chamber with window indicator dispenses virtually any size or shape cup. Hinged used cup flap; snap-in disposal chamber. Complete unit flush with wall, easily cleanable. Dimension 6"W 5"D 59"H. Wall-opening: 5 x 5 x 57½".

Model Ac-31b Dispenser-Filler-Disposal Unit (Right)

Fully recessed unit, construction as Ac-31a but with self contained push-button cup-filler and drain. Dimensions 6"W 5"D 69"H. Wall-opening: 5 x 5 x 67½".

WALDWICK, N. J.

Filtrine

SPECIAL COOLERS FOR SCHOOL CAFETERIAS

B MODELS—Standard: White Duco cabinet, S/S top, (2) bubblers. When specified: — S/S cabinet, storage bin & top, glass fillers, shelves, etc. Height — 33" or 36" as required.

SMW MODELS — Standard: White Duco cabinet, S/S upper front panel, top, drain tray; (2) glass fillers front, (1) bubbler 30" off floor on end. When specified. — S/S cabinet, shelves, etc.

DESIGNED BY A SCHOOL DIETITIAN — Not just ordinary coolers with a school tag, but especially designed in height, capacity and construction, to meet rigid school requirements.

CHILLED WATER AT CHILD HEIGHT — Filtrine manufactures a complete line of Coolers that are specially designed for use in school cafeterias, including "SCOOLER" with 33" low fixtures for elementary schools, and "HI-SCOOLER" for all-age drinking.

MULTIPLE OUTLETS — Speedy two-at-a-time drinking from multiple outlets prevents bottlenecks, keeps lines moving, cuts serving time.

HUNDREDS CAN DRINK — Extra storage reserve means cooled water at all times — no waiting — no matter what the load. Filtrine storage capacity is at least 50% of hourly capacity — the big difference between Filtrine School Coolers and ordinary units.

STAINLESS • WHITE DUCO • COLOR-TO-MATCH — Because they are available in a wide range of cabinet finishes, these Coolers are an attractive addition to any school cafeteria. Stainless steel is 18-8 No. 304 hand-polished to bring out lustrous beauty and provide lasting protection. Send sample when ordering color-to-match.

"TASTE-MASTER" PURIFIER ——— Specify "Taste-Master" on every water cooler . . . traps sediment, rust, and chlorine tastes and odors . . . gives water spring-like freshness and sparkle . . . available on all models

WIDE CHOICE OF FIXTURES AND ACCESSORIES— Bubblers, fillers for glasses, pitchers or paper cups . . . shelves of various sizes and types . . . in combinations to suit every need.

SELECTION TABLE

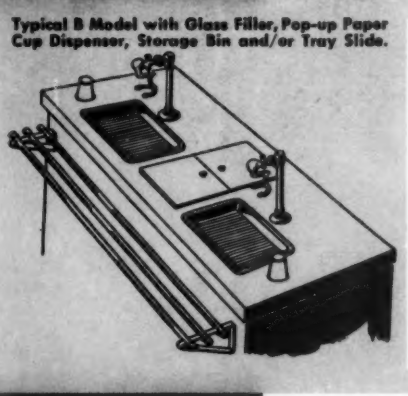
Cooler Model	Gallons Storage	Capacity 80°-50° 1-Hour Peak Gals.	1-Hour Peak Persons*	2-Hour Peak Gals.	2-Hour Peak Persons*	Mach. H.P.**	Taste-Master Purifier	Dimensions in Inches W	D	H	†Ship'g Wt. lbs.
SMW-7-S	7	14	224	24	384	⅓	No. 4 TM	28	22	45	450
B-14	14	22	352	37	592	⅓	No. 4 TM	32	22	33	400
B-14	14	29	464	51	816	½	No. 4 TM	32	22	33	400
SMW-14-S	14	29	464	51	816	⅓	No. 5 TM	28	22	45	500
B-25	25	50	800	88	1408	¾	No. 5 TM	36	25	44	480
SMW-25-S	25	50	800	88	1408	¾	No. 5 TM	35	22	45	510

* Based on equivalent of (1) 8-oz. glass per person.
** Water-cooled machine recommended where practical.
† Weight includes allowance for condensing unit.

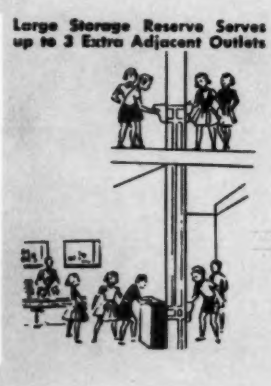
BRIEF SPECIFICATIONS

Furnish and install (1) Filtrine (SMW-14-S) Water Cooler as manufactured by Filtrine Mfg. Co., Waldwick, N. J., having a storage of (14) gallons and a 1-hour peak capacity of (29) gallons, cooling from 80° to 50°. Cabinet to be 20 gauge hand-polished S/S four sides, (or white Duco finish with S/S upper panel), top and drain tray. Drain tray and panel to be one-piece construction without screws. Interior frame, heavy reinforced angle iron. No. 4 Tastemaster Purifier included. Furnish front with (2) glass fillers (or (2) bubblers) and (Right) end with bubbler and drip tray 30" off floor. Furnish top (and/or one side) with (2) S/S shelves to hold approximately (100) glasses. Lower section to house a (½) h.p. air (water) cooled (120) volt (60) cycle (single) phase condensing unit by ( ), with start-up and one year's free service.

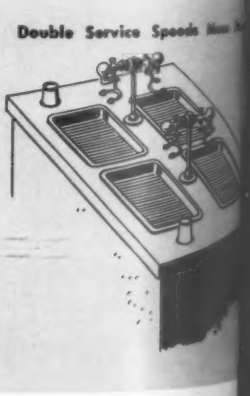
Scooler B-14. 33" Low for Grade School Pupils



Typical B Model with Glass Filler, Pop-up Paper Cup Dispenser, Storage Bin and/or Tray Slide.



Large Storage Reserve Serves up to 3 Extra Adjacent Outlets



Double Service Speeds Mass

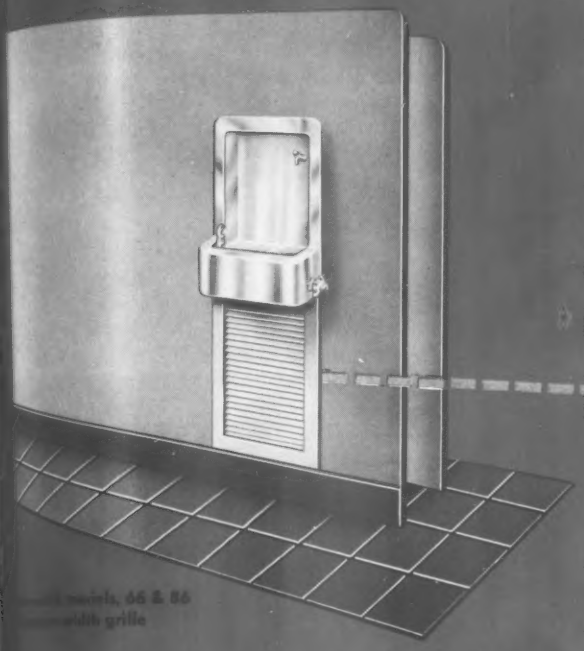
FILTRINE MANUFACTURING COMPANY • WALDWICK, N. J.

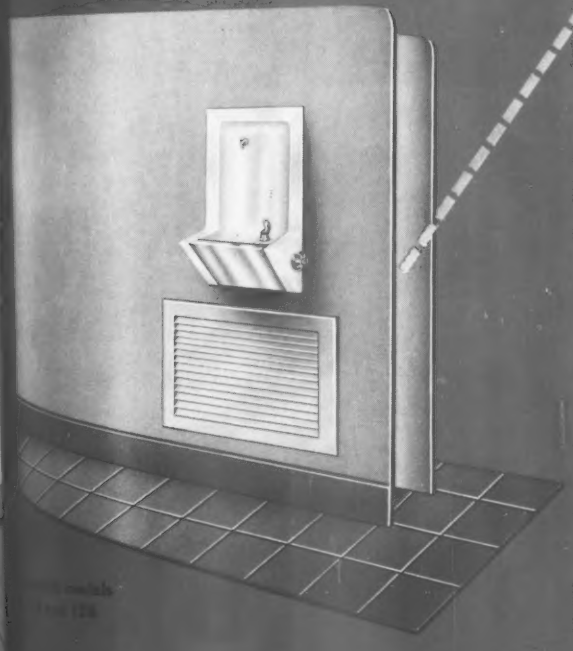
Filtrine

CONCEALED WATER COOLERS

WAL-PAK . . . the original, in-the-wall cooler

NEW "SLIM-LINE" MODELS

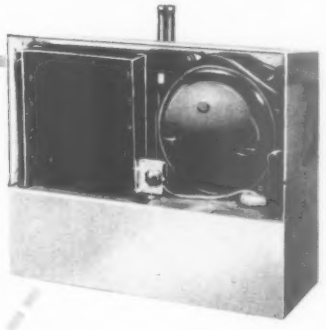




First important innovation in water cooling since development of the electric cooler, WAL-PAK was introduced in 1950. Now, in response to request from architects, we present a new, "slim-line" series to fit behind a new, concealed-screw grille now wider than the fountain above it. Wall opening for grille permits passage of the complete cooler for easy installation, inspection and service.

Both the new, narrow-width unit and the standard WAL-PAK are available with either air-cooled refrigerating system or long-life, silent, dependable, water-cooled machine requiring no grille. Both types designed with storage reserve equal to 40% of hourly capacity to meet Standards for remote coolers of this type.

Specified for the finest buildings to promote clean, spacious lines without corridor obstructions and to overcome disadvantages of exposed floor and wall mounted coolers, WAL-PAK is also safe from tampering, wear, abuse . . . and is never obsolete.



Two types available:

Shallow depth model
Only 6¼" deep

Narrow-width model
Only 11⅞" wide

Only WAL-PAK has these exclusive features . . .

- **Exclusive, large-storage design.**
- **Fully enclosed against dust, moisture, handling abuse.**
- **Cooling unit and storage tank individually vibration-insulated.**
- **Fast, slide-in installation in steel enclosure.**
- **Slide-out refrigerating system for inspection and service.**
- **10-year warranty.**

Typical Specifications

Models 56 through 126

Install in wall, Filtrine WAL-PAK Cooler Model (76-K) with 10-year warranty. Dimensions not to exceed (23¾" W, 8¾" D, 20" H). Cooler to be factory-installed in Ac-22 steel enclosure on adjustable mounting frame for "push-in" installation of fountain, cooler and grille as a unit. Grille to be Filtrine model 2420 horizontal bar-type with metal wall frame for snap-on or concealed screw installation. Storage, (3.7) gals; recovery, (4.5) g.p.h., 80.50°. Condensing unit, 115-60-1 hermetic water (air) cooled with adjustable thermostat, filter-dehydrator, charging valve and condenser, all protected 3 sides and top with heavy shroud and mounted above baseboard on slide-out base for servicing without breaking connections. Cooling tank, 18/8 S/S, 250# test for 125# w.p., insulated with urethane foam with positive vapor seal, in 18g. steel container on vibration isolators.

Models 66 and 86

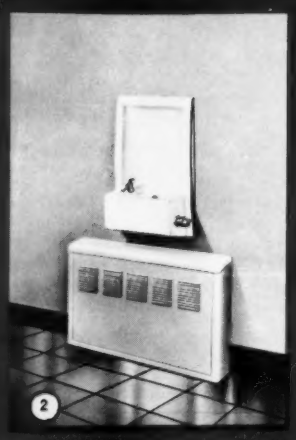
Install in wall Filtrine WAL-PAK Model (66-K) cooler with 10-year warranty. Overall dimensions not to exceed (11⅞" W, 9⅞" D, 21" H). Cooler to be installed on adjustable mounting frame for "push-in" installation of fountain, cooler and grille as a unit. Grille to be horizontal bar type, Filtrine model 1226 with metal wall frame for snap-on or concealed screw installation. Grille not to exceed width of fountain and allow passage of complete cooling unit. Storage (2) gals; recovery (4.5) g.p.h. 80.50°. Condensing unit, 115-60-1 hermetic water (air) cooled with adjustable thermostat, filter-dehydrator, charging valve and condenser, all protected 3 sides and top with heavy shroud and mounted above baseboard on slide-out base for servicing without breaking connections. Cooling tank, 18/8 S/S, 250# test for 125# w.p., insulated with urethane foam with positive vapor seal, in 18 g. steel container on vibration isolators.

Filtrine

CONCEALED WATER COOLERS

WAL-PAK accessories for efficient, low-cost installation

In-the-wall enclosure — Under-fountain enclosure



Enclosures

① In-the-wall enclosure — Ac-22

Built in sizes to accommodate all WAL-PAK models, the Ac-22 enclosure is designed for quick, easy slide-in installation without further framing and for permanent protection of cooler and controls during shipment, installation, operation. Of chromated, 18 g. steel construction it is furnished with adjustable legs, internal junction box and concealed-screw grille for air-cooled units, or access plate for water-cooled units . . . providing access to machine and fountain clean-out. Access plate may be on reverse side of wall, leaving space beneath fountain completely clear.

② Under-fountain enclosure — Ac-23

Most practical, inexpensive means of modernizing existing fountains with chilled water. Famous WAL-PAK design in chromated steel cabinet for simple, under fountain installation. Allows ample toe space. Hugs wall like radiator — keeps corridors clear.

Cooler Model	Storage Gallons	Fountains Served	G.P.H. 80—50°	Mach. H.P.	Dimension—Inches W	D	H	Wall Opening Required Inches W	D	H	Overall Grille Size W	H	Water In/Out	Ship. Wt. lbs.
66 (H or K)*	2	1	4.5	1/6	11⅞	9⅞	21	12½	10½	26½	15½	29½	⅜"	110
86 (H or K)*	3.7	1-2	9	1/4	11⅞	12	23	12½	12½	26½	15½	29½	⅜"	140
56 (H or K)*	2	1	4.5	1/6	23	6¾	18¼	24	8	21	26	23	⅜"	100
76 (H or K)*	3.7	1**	4.5	1/6	23¾	8¾	20	24	10	21	26	23	⅜"	115
112 (H or K)*	3.7	1-2	9	1/4	23¾	8¾	20	24	10	21	26	23	⅜"	125
126 (H or K)*	6	1-2**	12	1/3	25	12½	25	26	14	26	28	28	⅜"	180

*H denotes air-cooled: K denotes water cooled

**For heavy usage as in schools, hospitals, etc.

BW Model wall-mounted

BEHIND-THE-WALL COOLERS

These models, designed to supply 1 to 5 outlets from a remote "behind-the-wall" location are built for mounting on the floor or on the wall in service closet or other concealed position.

TYPICAL SPECIFICATIONS

Supply and install (on the floor) (on the wall) as shown on plans, Filtrine factory-packaged cooling unit. Minimum storage (14) gallons, recovery (22) g.p.h. reduced from 80°-50° with 90° condensing medium. Field-serviceable hermetic system, F-12, (water-cooled for (115v 60c 1p) installed with automatic controls, wiring and freon. Storage cooling tank to be extra-heavy welded steel plate, hot-dip galvanized after construction and shall be Filtrine chromate processed, tested as 250# for 125# w.p. Approved Model (M-14-BW) including "Tastemaster" Purifier, as manufactured by Filtrine Mfg. Co., Waldwick, N. J. Contractor shall provide initial check-up and 1 year's free service.

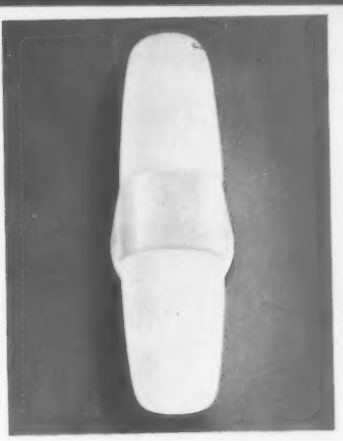
BW Model — floor mounted

Cooler Model	Gallons Storage	Fountains Served**	G.P.H.* 80-50°	Mach. h.p.	Dimensions, inches W	D	H	Taste-Master Filter	Shipping wt. lbs.
BEHIND-THE-WALL									
M-2-BW	2	1	4.5	⅙	24	8	20	#4TM	100
M-4-BW	4	1	9	¼	24	10	21	#4TM	120
M-6-BW	6	1-2	12	⅓	23	13	23	#4TM	150
M-14-BW	14	2-4	22	½	30	18	30	#5TM	400
M-25-BW	25	3-5	34	¾	35	22	36	#6TM	520

*Capacities based on water-cooled machine. If air-cooled machine is specified, deduct 20%

**Piping between cooler and farthest fountain should not exceed ⅜" size, 10' length

209 " Porzeline "
Details on Page 4. ▶



ARCHITECTURAL LIGHTING FIXTURES

A. W. PISTOL. INC.
8 - 10 DRAKE AVENUE
NEW ROCHELLE, NEW YORK
NEw Rochelle 6-8332

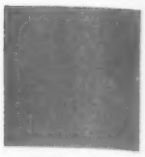
320/N Same as shown on PAGE 3 No: 320, but with house numbers, (holds maximum 4 figures). Please specify. Numbers can be supplied at extra charge. ▶

LIST OF REPRESENTATIVES:

RICHARD ABRAHAMS	16829 Shileno Place, Encino, Calif.	STate 8-9696	California and Arizona
JOE BABB	2115 First Ave., South, Birmingham, Ala.	FAirfax 4-1960	Alabama
HOWELL CARTER II	2058 Myrtle St., Baton Rouge, La.	DI 4-8994	No. Louisiana & No. Miss.
W. D. FAUST	833 Howard Ave., New Orleans, La.	JA 2-5791	So. Louisiana & So. Miss.
ERWIN MILLER	530 E. 90 St., New York 28, N. Y.	LEhigh 4-0831	New Eng., Metro. New York, New Jersey, Eastern Pa., Dela., Maryland, Wash., D. C.
NORTON PARKERSON CO.	3827 Richmond Ave., Houston, Texas	MO 4-1795	Southern Texas
ROBERT A. PIERCE	P. O. Box 6043, Charlotte, N. C.	EM 6-3290	North & South Carolina
BOB PINN'S SALES CO.	335 N. E. 93rd St., Miami Shores, Fla.	PLaza 4-0412	Florida
PERRY G. SESSOMS, JR. & ASSOC.	305 Techwood Dr. N. W., Atlanta, Ga.	JAckson 4-7517	Georgia
ADOLPH M. RADIN	2745 Sulgrave Rd., Cleveland, Ohio	INgersoll 4-9282	Ohio, Michigan, Kentucky, W. Penna., Ind. (except S. Bend & Gary)
SHERMAN WEINER	3516 Walnut Ave., Wilmette, Ill.	ALpine 1-8397	Ill., Wisc., incl. Green Bay, So. Bend and Gary, Ind., Minnesota, Col., Utah, Iowa, Washington, Oregon, Nebraska, Missouri
WHITLOW-BRISCOE CO.	4227 Herschel Suite 102, P. O. Box 6924, Dallas 19, Texas	LAkeside 6-2436	Northern Texas and Oklahoma

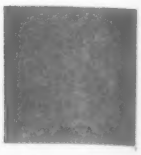
← 1852/24

Bitter Gold



Smoky Gray

Willow Green



Wedgewood Blue

Tomato Red

Sandalwood Beige

SOFTGLODOMES

▲**1672/34** SOFTGLODOME diameter 34" aluminum shade, top, stem and canopy sprayed in the following semidull baked colors:
BITTER GOLD WEDGEWOOD BLUE TOMATO RED
WILLOW GREEN SANDALWOOD BEIGE SMOKY GREY BLACK
Inside part of shade sprayed white, with opal triplex dull 1672 glass, glass diameter 12", glass height 5½" (2-75 Watt bulbs) overall length 24" or 36".

1852/34 Same as above, but with opal triplex dull 1852 glass, glass diameter 14", glass height 6¾" (3-100 Watt bulbs).

1673/34 Same as above, but with opal 1673 triplex dull glass, glass diameter 16" glass height, 6¾" (3-100 Watt bulbs).

1672/30 SOFTGLODOME diameter 30" with opal 1672 Glass. (2-75 Watt bulbs) overall length 24" or 36".

1852/30 Same as above but with opal 1852 glass (3-100 Watt bulbs).

1673/30 Same as above but with opal 1673 glass (3-100 Watt bulbs).

1672/24 SOFTGLODOME diameter 24" with opal 1672 glass (2-75 Watt bulbs) overall length 24" or 36".

1852/24 Same as above but with opal 1852 glass (3-100 Watt bulbs).

1673/24 Same as above but with opal 1673 glass (3-100 Watt bulbs).

329 Wallbracket, 1-lite height 9", width 7", extends 8½", (1-100 Watt bulb) pullswitch.

326 Chandelier 8-lite, body dark grey, arms polished brass, shades smoky grey with 8 glasses 442 satin opal, diameter 35½", body height 9", overall length 24 or 36" (8-100 Watt bulbs). ▶

327 Same as above but 5-lite, diameter 26", body height 9".

328 Same as above but 3-lite, diameter 20½", body height 9",

(all the above can also be supplied without stem as ceiling fix tures, please specify).

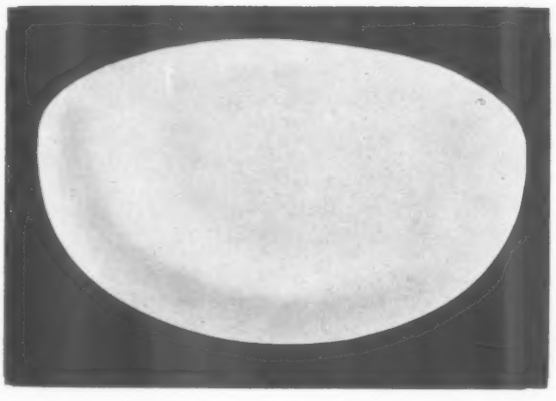
326, 327, 328, 329, can be supplied in colors bitter gold, willow green, wedgewood blue, sandalwood beige and tomato red at an additional charge, please specify.

330 Ceiling bowl, opal triplex silkfinish glass, (1-75 Watt bulb) diameter 8", width 8", height 4½".
331 Ceiling bowl, opal triplex silkfinish glass (2-75 Watt bulbs) diameter 10", width 10" height 4½".
332 Ceiling bowl, opal triplex silkfinish glass (3-75 Watt bulbs) diameter 12", width 12", height 4½".
333 Ceiling bowl, opal triplex silkfinish glass (3-100 Watt bulbs) diameter 14½", width 14½", height 5".

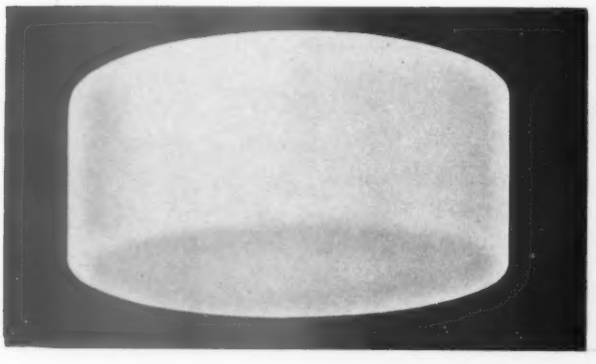
All the above come equipped with our "NO METAL SHOW" holder displayed below.

◀ **320 Wall-lite, height 7", width 9¾", extends 5½", glass screwtype satin opal, canopy porcelain. (1-75 Watt bulb). (Also useable as ceiling lite).**

271 CEILING BOWL dia. 12", height 5½" (2-75 Watt bulbs) satin opal triplex glass with our NO-METAL-SHOW holder. ▶
287 CEILING BOWL dia. 14", height 6¾", for 3-100 Watt bulbs, satin opal triplex glass with our NO-METAL-SHOW holder.

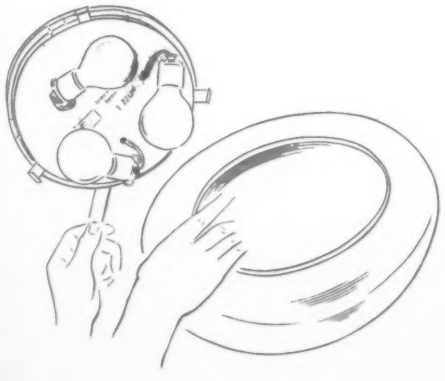


◀ **1672** Ceiling bowl, opal triplex silkfinish glass (2-75 Watt Bulbs) diameter 12", height 5½".
1852 Ceiling bowl, opal triplex silkfinish glass (3-75 Watt Bulbs) diameter 14", height 6¾"
1673 Ceiling bowl, opal triplex silkfinish glass (3-100 Watt bulbs) diameter 16", height 6¾".
1851 Ceiling bowl, opal triplex silkfinish glass (3-100 Watt Bulbs) diameter 18", height 7".
1674 Ceiling bowl, opal triplex silkfinish glass (3-100 Watt bulbs) diameter 20", height 7½".



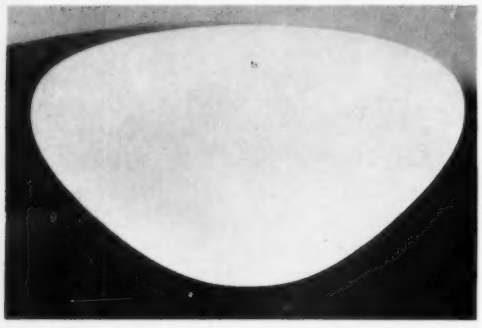
2140 Ceiling drum, opal triplex silkfinish glass diameter 12" (2 - 75 Watt bulbs) height 5". ▶

2141 Ceiling drum, opal triplex silkfinish glass, diameter 14" (3 - 75 Watt bulbs) height 6".



All the above except 334 are equipped with our "NO-METAL-SHOW" Holder as shown on DRAWING to the left, which permits mounting of glass without any tools, and no metal showing anywhere.
"PATENT PENDING"

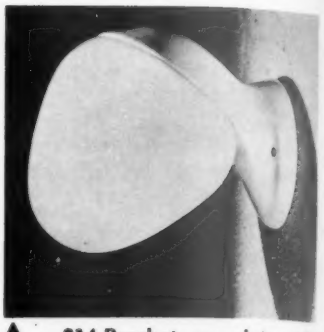
THE "PORZELINE"



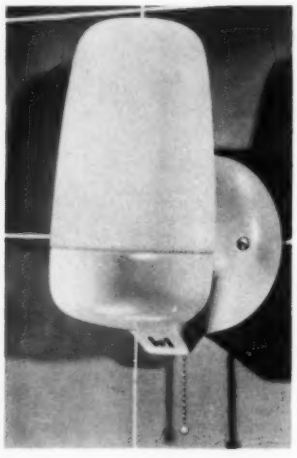
◀ **206** Canopy porcelain with screwtype opal triplex silkfinish glass, diameter 10", height 5½" (1-75 Watt bulb).

207 Same as above but diameter 12", height 6¼" (1-100 Watt bulb).

208 Same as above but diameter 14", height 7" (1-150 Watt bulb).



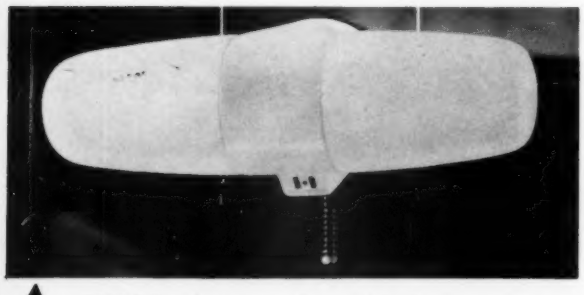
▲ **214** Bracket, porcelain with screwtype triplex silkfinish glass, diameter 6¼" extends 8¼" (1-75 Watt bulb).



217PS Bracket, porcelain with screwtype triplex opal silkfinish glass. Height 8", extends 5" (1-100 Watt bulb) shaver outlet. Porcelain available in white, black, light green, light blue, pink and grey. Pullswitch. ▶

217 Same as above, but without shaver outlet and without pullswitch.

▲ **215** Bracket, porcelain with screwtype triplex opal silkfinish glass. Diameter 6¼" extends 8" (1-75 Watt bulb).



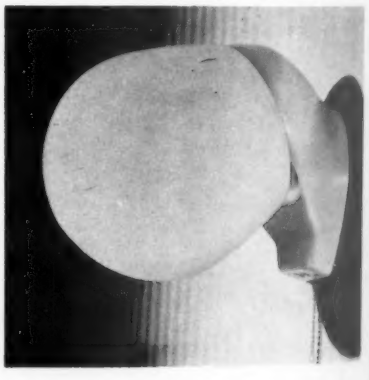
▲ **209PS** Bracket, porcelain with 2 screwtype triplex opal silkfinish glasses, width 15", extends 5" (2-100 Watt bulbs) comes with shaver outlet and pullswitch. Porcelain available in same colors as 217.

209 Same but without shaver outlet and without pullswitch.

▲ **210** Canopy porcelain with screwtype opal triplex silkfinish glass. Dia. 7¾", height 9½" (1-200 Watt bulb).

216PS Bracket, porcelain with screwtype triplex opal silkfinish glass. Dia. 6¼", extends 8¼" (1-75 Watt bulb). Shaver outlet, porcelain available in colors (see 217). Pullswitch.

216 Same but without shaver outlet and without pullswitch.



◀ **211** Canopy porcelain with screwtype opal triplex silkfinish glass. Diameter 8", height 7" (1-100 Watt bulb).

212 Same as above but diameter 10", height 7¾" (1-150 Watt bulb).

213 Same as above but diameter 12", height 8½" (1-200 Watt bulb).

IT IS IMPORTANT, THAT THE FOLLOWING ADVANTAGES ARE BEING POINTED OUT TO THE TRADE:

a. The glass has a threaded collar and is being screwed into the canopy, therefore very easy mounting and no tools necessary.
b. The line has been approved for outdoor lighting and each glass comes with a rubber gasket to make it air and watertight.
c. The canopy is simply mounted with 2 screws directly to the outlet box therefore very easy to attach.
d. All glass is triplex opal satin finish imported glass with absolutely no glare and no highspot and makes for excellent soft lighting.

WHEN ORDERING WALL BRACKETS PLEASE STATE ALWAYS:

1. If white or colors are required and what shades.
2. If so available whether with or without pullswitch and shaver outlet.

A.W. PISTOL, INC., 8-10 Drake Avenue, New Rochelle, N.Y. – Phones NEw Rochelle 6-8332 - 8333

D GROUNDS AND TRANSPORTATION

EDITORIAL

School Bus Purchasing Analysis — D 1

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Realock Fence, The Colorado Fuel and Iron Corporation, Wickwire Spencer Steel Division — D-1/Co

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American Bridge Division, United States Steel — D 9
Pittsburgh-Des Moines Steel Co. — D-3/Pi
Snyder Tank Corporation — D 10

Outdoor Play Apparatus

Ever-Wear — D 11
Trojan Playground Equipment Manufacturing Co. — D 12

Grounds Maintenance Equipment

Devere Company — D 13
Gravely Clean-Cut Mowers — D 14
Gravely Tractors — D 15
Jacobsen Manufacturing Company — D 16

To get the most value from your copy of AS&U—use the green-colored Reader Service post cards to get further information on specific products and manufacturers.

School Bus Purchasing Analysis

by Joseph B. Duteil, Jr.
Transportation Manager, New Orleans Public Schools, Louisiana

Mr. Duteil has been transportation manager for the Orleans Parish Public Schools since 1951. He has a bachelor's degree from Loyola University and has done graduate work at Tulane University. Orleans Parish presently operates 81 buses, a fleet of trucks and other equipment totaling about 150 units of all kinds.

THE DECISION to purchase a new school bus is only the first step toward the actual purchase. The new bus should fit particular needs of the school client and there are many factors to investigate and appraise. Needless to say, it is more expensive to add or make alterations to a completed unit than to get the proper equipment the first time. As a starting point it is a good idea to reduce to writing certain basic information. Visualize in general terms the work the bus is to do and the way it must be done. If you cannot conjure a mental picture of the bus desired, perhaps what you really need is a station wagon or truck. Or you may find it cheaper to contract for a certain service than to purchase a bus of your own. Once the need for the bus has been established, you can proceed with your purchasing analysis.

The number of passengers to be carried not only governs the overall size and weight requirements of a bus but, as the size of the passenger increases, distances between seats must be greater, ceilings must be higher and other design factors must be considered. If a bus is to transport athletic teams or bands, provisions are necessary for equipment and uniforms. Buses for handicapped children are adapted for the purpose with side loading doors, special seating and lifts or other special equipment.

Distance and time factors may influence the size of the bus to be purchased. In rural communities two small units may be sufficient to handle a certain number of passengers when one large vehicle can do the same job in an urban area. Also, consider the possibility of two trips for a single bus rather than the purchase of another bus.

Climate is an important factor, especially in areas of extreme temperature or humidity. Climate governs such equipment as defrosters to help the driver see better, special lighting for fog conditions, tire chains or snow tires.

Traffic Conditions

Traffic conditions determine if the bus will operate primarily on highways, city streets, narrow alleys or passageways, flat or hilly terrain. Are the turns wide in radius or very sharp? Is the area of operation congested by other vehicles and pedestrians? How fast must the vehicle travel to keep up with traffic flow?

And finally money carries much weight in determining the bus to purchase. Regardless of other factors the amount budgeted for the purchase will govern final selection. All of us would probably like to have air-conditioned, transit type, plush-seated, rocket-powered buses, but the reality of the situation is we must get a safe vehicle that will do a certain job and still be in our price range.

At this point we must decide what is most important—passenger comfort, capacity, speed, safety, economy of operation or any other items that enter the field of concentration. Somewhere there is an acceptable standard for a bus that will be a com-

promise between wants and needs. This answer can only be found when all known information has been gathered, written down and analyzed.

Building the Bus

We start to "build" the bus on paper. Luckily we do not have to do this alone. Some state departments of education have central purchasing machinery set up to assist or handle bus purchases. Others help in varying degree. Different states have different requirements and it is good practice to investigate the requirements for a particular state before going too far. At the same time, determine what reimbursement, if any, your county will receive from the state for engaging in pupil transportation, what the law says about liability, and what else is involved before you get into the business of moving human beings from one place to another.

At the national level, "Minimum Standards for School Buses" is a booklet published by the National Education Association, 1201 Sixteenth Street, N.W., Washington, D. C., available at slight cost. This booklet contains the best thinking of transportation people, chassis manufacturers, and body makers as to what a school bus is, what it should contain, how it should be made, and what materials should be used. Unfortunately, the latest issue was published in 1954. Recently a series of meetings were held and a revised edition of the standards is expected shortly. It must be remembered that the booklet contains information on a basic school bus that will do a safe job. It does not represent the latest in equipment nor the finest features of the ultimate in school buses. Every major manufacturer of either school bus chassis or bodies uses these data as a base for construction of their equipment, which in itself is an indication of the soundness of the principles involved.

Another excellent source of information can be tapped to advantage—the sales engineers in the business. A note or telephone call to truck and bus dealers will result in the accumulation of technical data needed to write intelligent specifications. Unless your area is much different from mine, each inquiry will also bring a salesman to your office to explain the ultimate in vehicles to handle the job. By putting all this information together, your finished specification will be truly competitive. It is seldom that manufacturers do not market similar items.

Ways to Purchase

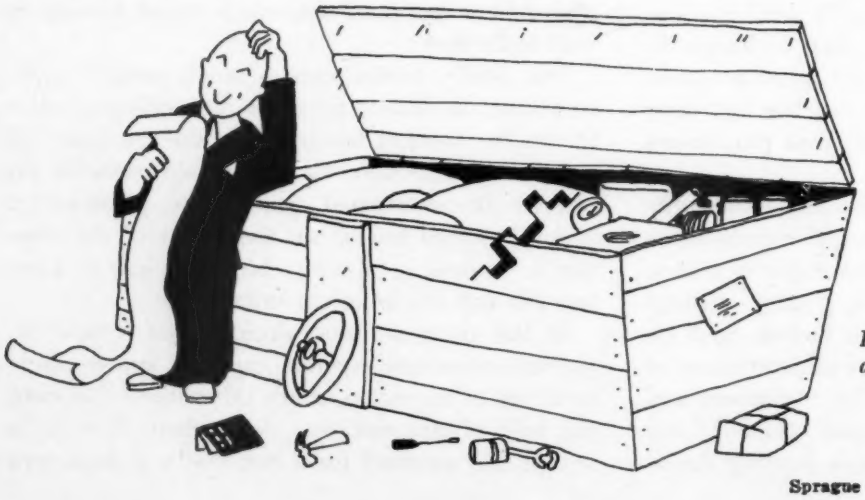
School buses can be purchased in several different ways. When purchased as a composite unit from a bus company the vehicle is known as the transit type bus, similar in appearance to commercial buses. If the engine is in the rear it may be referred to as a "pusher."

The "conventional" type school bus is in reality a modified truck chassis with a school bus body. This unit is usually purchased through a truck dealer.

Or the bus can be purchased as a dual purchase. You can negotiate first with a chassis manufacturer for a particular chassis and then with a body maker to build a body to your specifications and to fit the chassis. Many operators find this a way to make considerable savings particularly when they can handle their own transporting between chassis plant and body plant.

Now that you have been exposed to the "wisdom" of the industry, and have become familiar with state regulations and minimum requirements, it is advisable to sit down with all the information and once again start to write certain basic information.

1. Which method should be followed in purchasing the bus?
2. Which type will suit needs best?
3. Which type will the budget allow?



For greatest economy, how about a do-it-yourself school bus kit?

Sprague

By consulting the accumulated library of information and remembering what the salesmen said about prices, you will soon decide in which direction you must go.

Basic Considerations—Seats

General differences in components of a vehicle serve to guide the purchaser as he condenses information into a finished bus specification. Using the premise that each manufacturer builds a safe and functional bus, we get to a point where the question is "which is best for me?"

Let's start with the passenger area. First we consider the seats. How many? How far apart? What type? There are single reclining seats, as on commercial buses, standard school bus seats, or special seating, as in the case of handicapped children.

Should seat frames be steel with a painted finish? If rust is a problem, you have several alternatives: use stainless steel for the entire frame; use aluminum for the entire frame; use a combination of painted finish with the top section of stainless, chrome, or aluminum (this is standard procedure and economical).

How should seats be fastened to the bus body? Again there are alternatives: two legs on the aisle side fastened to the floor, the other side fastened to the wall; four legs on each seat, all fastened to the floor. Seats can be attached with bolts and nuts, rivets, or lag type screws.

The driver seat is standard for school bus use. However, a special seat may be required for long routes or if the driver is behind the wheel for extended periods. Check forward and aft adjustments, as well as up and down. The driver should be able to adjust the seat without tools or complications.

The standard school bus seat for pupils is usually sufficient for normal operations. However, particular situations may prompt alterations. For example, one school district uses an offset aisle which has the effect of making one seat larger and the other smaller than standard.

Driver Area

Instruments on the dashboard include speedometer and odometer, ammeter, oil pressure indicator or gauge, fuel gauge, tachometer and clock. Mirrors are important pieces of equipment. There should be one large interior view mirror, and one each for right and left side viewing. Some districts now have incorporated special mirrors for viewing directly in front of the bus. In this way children can be observed below the radiator line and out of the ordinary view of the driver.

Adequate lights are needed for night operation, safety and convenience. The heater for passenger comfort is usually placed near the bus driver. If not properly positioned it becomes an obstruction and may cause discomfort to the driver. In extremely cold areas, run ducts to rear sections of the passenger area to provide proper heating. Defrosters are a must for winter operations.

Most buses have two doors, one at the right front and the other in the rear center or at left center. Both are manually operated, the front door by the driver and the other or emergency door by passengers in case of emergency. Front doors are usually made in two sections, one section opening outward and the other inward, or both may open outward. The emergency door must always open outward. Proper locking devices of good material should be provided. A signal device on the emergency door will notify the driver of its opening and is a common safety feature. If the emergency door is to be at the rear, it is good practice to have a

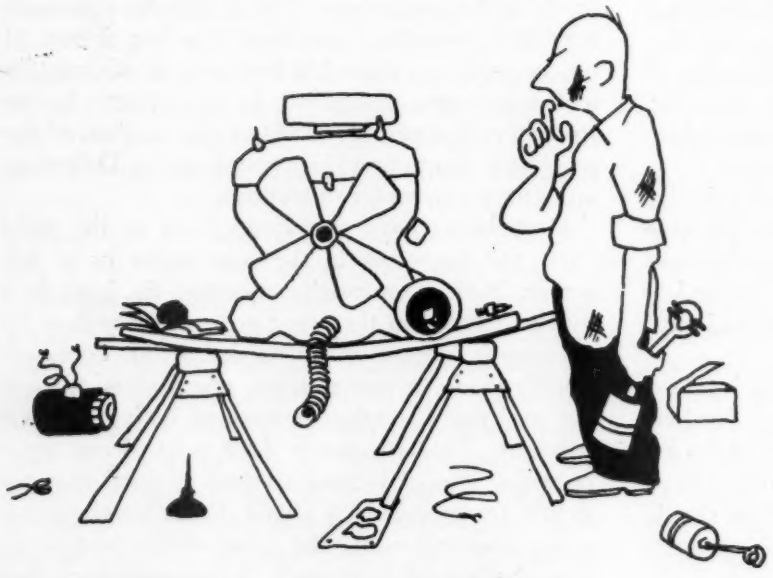
Axles and frame are important.

glass panel in the lower section, as well as in the upper.

Windows and Windshields

Always specify safety glass for windows. Use tinted or other glare resistant glass in the windshield. Side windows come in two types—full opening windows (which should have stops to adjust the amount of glass to be lowered) and split-sash windows. The lower part of split-sash windows is permanently fastened in place and the upper section slides up and down.

Aluminum or steel sash may be purchased. Locking devices come in various forms but the less moving parts they have the better. Windshield wipers can be electric or vacuum operated. Electric wipers are preferred because of the positive movement under all conditions. Make sure wiper motors are installed out of the driver's way and do not interfere with the door operating handle. The driver should have a sun visor that folds back out of the way when not in use. Before leaving the bus interior we emphasize that ceiling height and overall length of the bus body deserve special mention in the specifications.



Engine should be the right size for the job.

The Chassis in General

Standards for chassis selection are the combination of minimum gross vehicle weight (GVW—the total weight of the vehicle, including body, payload, fuel, driver, etc.) and wheelbase (WB—the number of inches between the center of the front axle and the center of the rear axle). A vehicle should be able to carry anticipated loads and also be long enough to give the shortest possible turning radius and the proper amount of overhang for the bus body. Too light a chassis will cause an unequal distribution of weight and a lightness in the front end. Such lightness causes steering difficulties with a tendency for the front end to lift off the ground when the rear section is loaded.

Stating only the GVW and the WB is not the end of the line. Most manufacturers can change figures by changing tire size and components. The overall GVW may then result in your requirement, but the distribution may not be what you need. Therefore, it is advisable to consider several other components.

Frame and Axle

The frame is actually the backbone of a bus. If side members are used for the frame, and this is not necessarily so with the new unitized type of construction, it is advisable to have them of one piece construction. Never allow extension of frame side members to extend the wheel base. Also, never permit any alteration of the frame itself, unless made and guaranteed by the chassis manufacturer.

Front axles carry a substantial part of the total load and also act as the base for steering. Read through your "library" carefully and determine the weight axle for your particular needs, as specified by the majority of the manufacturers. If four or five manufacturers use a certain weight-rated component for a certain size vehicle, you can be reasonably assured that the majority opinion is the right one. One axle may look like another and may work as well as another under certain conditions, but every precaution must be taken to obtain the right component for the particular job. Although independent front wheel suspension eliminates the front axle in later model equipment, the rating of

the front end should be analyzed very carefully.

Rear axles are usually of the full floating type (the weight of the vehicle is not carried by the actual driving shaft but on the axle housing) and may be purchased in one or two speeds. Two-speed axles are built so that the ratio of the rear axle can be changed by the driver while the vehicle is in motion, to compensate for various driving conditions. Unless there is wide variance in terrain a single speed rear axle should be sufficient for school bus use.

Brakes and Engines

There are three types of brake systems for school buses—straight air, vacuum and vacuum over air. Selection from among the three depends on size of the bus to be purchased and the type brakes currently in use in your fleet. Air systems are best for large buses. Although more expensive initially, benefits in the form of faster stopping and less maintenance surpass the additional charge through the life of the bus. If vacuum brakes are selected, add a vacuum booster and also a vacuum reserve tank. Vacuum over air, which is a combination of the two systems, is rarely recommended for passenger carrying equipment.

A hand or parking brake is used on grades or when the bus must be held in a stationary position. The hand brake is not used to stop moving buses, but only to hold them in a stopped position. It is mechanical and separate from the brake system of the bus.

After its purchase, a school bus should perform as originally estimated. Engine size is closely related to GVW and the conditions under which a bus operates. A small engine may perform well in flat country but be inadequate in hilly or mountainous country. "Never send a boy to do a man's job" has been a true statement, and with engines it is almost gospel. Start with the right size engine.

Engine capacity is gauged by the horsepower delivered, the amount of torque developed, or the cubic inch displacement of cylinders. Each manufacturer sells by emphasizing a different part of an engine or segment of its performance. Gross horsepower, net horsepower, brake horsepower, gross torque, net torque, compression ratio, are a few items played up to show how one engine is "better" than another. The layman should find a common denominator upon which all manufacturers seem to agree. If it is net torque or net horsepower, you can rest assured that most manufacturers will have a similar product.

Three fuels are available for the engines—gasoline, diesel and LP gas (liquid petroleum). Always consider the supply situation before making a selection, this may save headaches later. Gasoline is more or less the standard fuel for school buses, but the diesel engine is slowly coming into its own. LP gas is practical for some operations, but not commonly used because of its newness and problems with the special fuel. At present, diesel engines cost more than gasoline engines. While diesel fuel costs are lower, it is found that savings over the extra cost of original investment can only be realized if a bus accumulates high mileage during each year of operation.

School bus chrome to finish the job.

Transmissions and Clutches

Most manufacturers recommend a particular standard transmission for a particular model of school bus. However, options are given in the size of the clutch. Get the largest available clutch that fits your bus. The more plate area the more pulling power with less chance of failure. The added cost for the larger clutch is minor compared with the added life and mileage. If you examine your literature you will note that several manufacturers use the same transmissions, and that the truck manufacturers do not necessarily manufacture their transmissions. For example, transmission X may be used in brand A, B and C truck. If you decide you need a particular type it can probably be supplied without much difficulty.

During the last several years many operators have turned to automatic type transmissions. This transmission eliminates a clutch and frees the driver from the task of selecting the right gear as

he operates the bus. This clears the driver's mind for other matters requiring attention and the engine operates at proper levels for all conditions. A great boon is thus added to school bus operation, particularly for women drivers, and lessens other distractions a driver has when cooped up with 60 or 70 active youngsters.

A word of warning here, automatic transmissions are only now coming into their own. They are intricate pieces of equipment. Unless a mechanic is on hand to make adjustments and repairs, it is wiser to use conventional or standard transmissions.

Tires and Wheels

Tires are probably the most advertised part of a school bus and the importance of good stopping and non-skid features is well known. We are all exposed to various brand names and types of tire cords—rayon, nylon, tyrex. We drive automobiles and see the same advertising, so most of us have definite opinions on the subject. The main thing is to get the proper size tire for the GVW. A spare tire and wheel can be purchased at the time of original purchase to save costs later on.

Wheels are of two general types, the spoke wheel and the pressed steel wheel. Here again it is a matter of opinion as to which is better, for prices run approximately the same.

Extra Equipment

Extra equipment is available for the school bus. Items include power steering, especially needed on heavy equipment or when the driver is a woman, fog lights, extra rear lights, special lights for state requirements and undercoating to protect the underside of the vehicle against rust and also to reduce road noises. Shock absorbers level out the ride and save strain on the springs. These are used on the front end only.

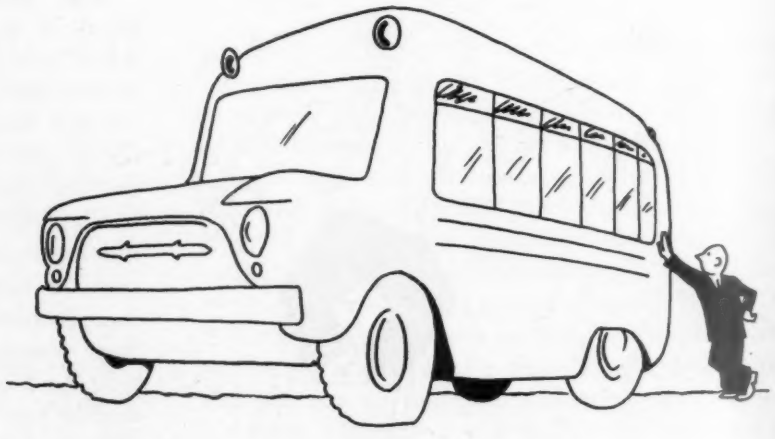
Special oil filters are available, the replaceable cartridge type is recommended. An air cleaner may be specified, get either the oil bath or dry element type. First aid kits are useful for minor injuries.

Most public school buses are painted National School Bus Chrome (yellow) with black lettering and trim. However, if you do not want these colors, be sure to specify exactly what you want.

The CO_2 type fire extinguisher, with at least a 2½-lb. capacity, is recommended. Extra capacity batteries and gasoline tanks are now available and are cheaper when purchased as original equipment than as a changeover.

When you reach this point of your school bus purchasing analysis and are proud of the bus that you have "built," stop for a minute and remember that you probably will be neither the driver nor the maintenance man for this bus. Before putting the specifications into formal type, review them with the people who will operate and maintain the bus. These people will tell you any fine points they notice from their viewpoint. You may or may not wish to include their suggestions, but at least you will have involved them in the selection procedure. They are now partners with you in seeing that the bus is all that is desired.

In purchasing a school bus, as in doing anything else, the equipment is only as good as the people who operate it. Get as much qualified help as you can.



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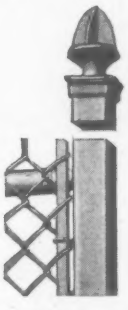


Anchor Square Terminal Post

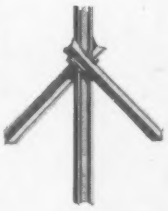
2. SQUARE TERMINAL POSTS—stronger because they are square in section. More protective—having no fabric-holding bands and therefore providing no footholds for climbing. Better-looking—because of their graceful lines.

Anchor H-Beam Line Post

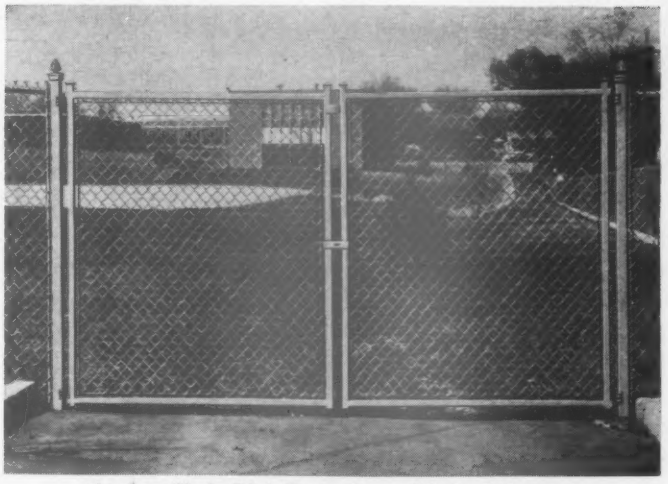
3. LINE POSTS—Aluminum or heavily galvanized, hi-carbon steel—H-Beam design. Available in heavy and extra heavy weight sizes. Pipe also available if desired.

4. DRIVE - ANCHOR - AGE—grips the soil like the roots of a tree. We have imitated nature's engineering by providing the line posts with a broad foundation. Anchor drive-anchors defy thaws, frosts and the many other strains to which a fence is subjected.

Note: While we strongly advocate the drive-anchor method of setting posts, we can, if desired, set our posts in concrete footing when conditions warrant such a procedure.

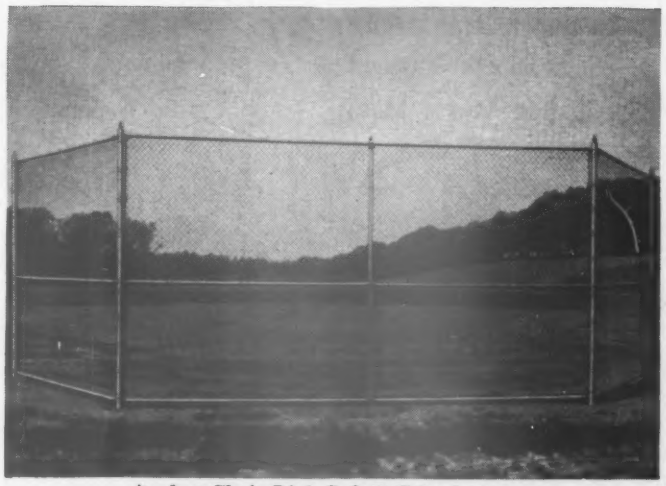


Post Drive Anchorage



Anchor Chain Link Fence Around School Grounds

Anchor Chain Link Tennis Enclosure



Anchor Chain Link Soft Ball Backstop

CYCLONE FENCE

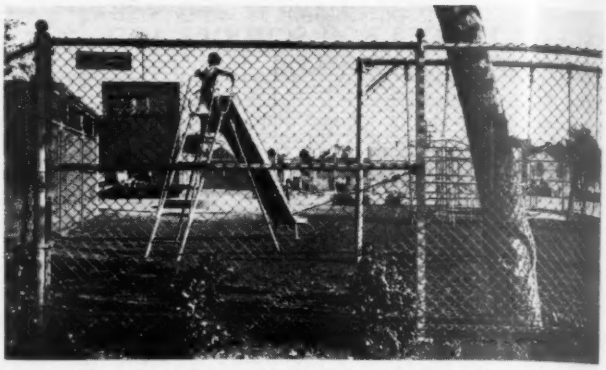
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION

614 Superior Ave., N.W., Cleveland 13, Ohio

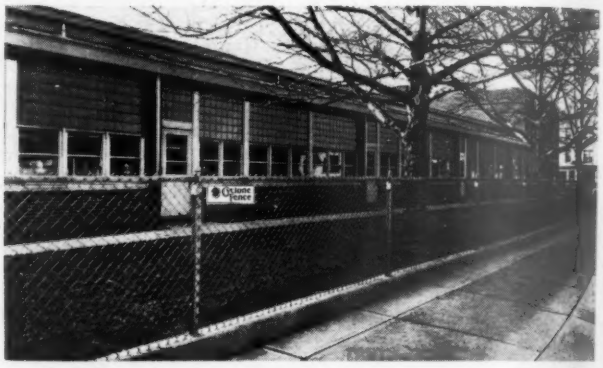
For enclosing school yards, playgrounds, athletic fields, outdoor pools—Cyclone Chain Link Fence provides the utmost in protection for children, property and equipment. And it's not surprising, because Cyclone has long specialized in fencing school property.

Because Cyclone Fence is a quality product, it is a worthwhile investment that pays off in years of trouble-free maintenance-free service. Cyclone gives full value for your dollar. Nothing but brand-new, top-quality material is used throughout. Posts and top rails are heavy and rigid. Gates won't drag. The chain link fabric is woven from heavy steel wire and galvanized after weaving for resistance to rust and corrosion. And Cyclone Fence can be speedily erected by our crews of factory-trained workmen.

For athletic fields, for stadiums—wherever paid admissions are a factor—a Cyclone Fence provides effective "entrance control" . . . makes gate receipts go up, and ticket collecting easy.



Cyclone Fence safeguards a playground. It prevents the children from wandering away into traffic and other dangers.



Cyclone Chain Link Fence is shown here enclosing a modern school. For use around most schools, Cyclone recommends the extra strength and weight of 6-gauge wire.

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Only United States Steel Corporation manufactures Cyclone Fence. Accept no substitute.

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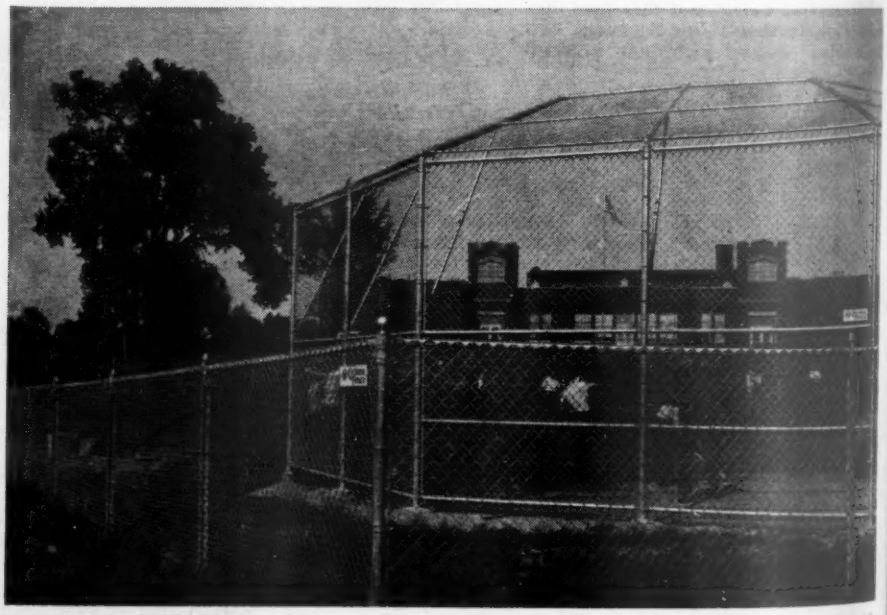

In addition to fencing, Cyclone also specializes in other athletic equipment such as this permanent style Baseball Backstop. Other items available are Portable Backstops, Tennis Court Backstops, steel Tennis Nets and Posts and Football Goal Posts.

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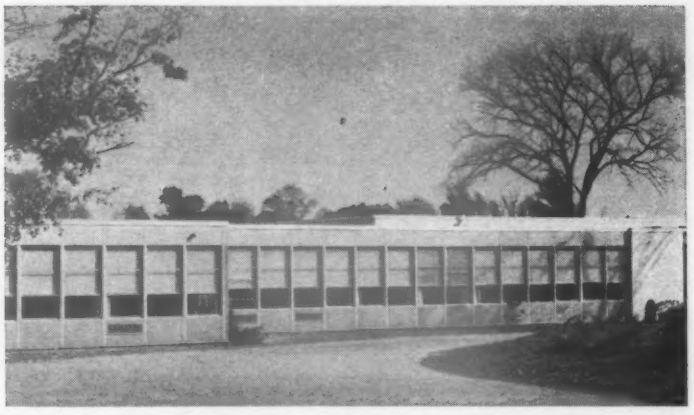

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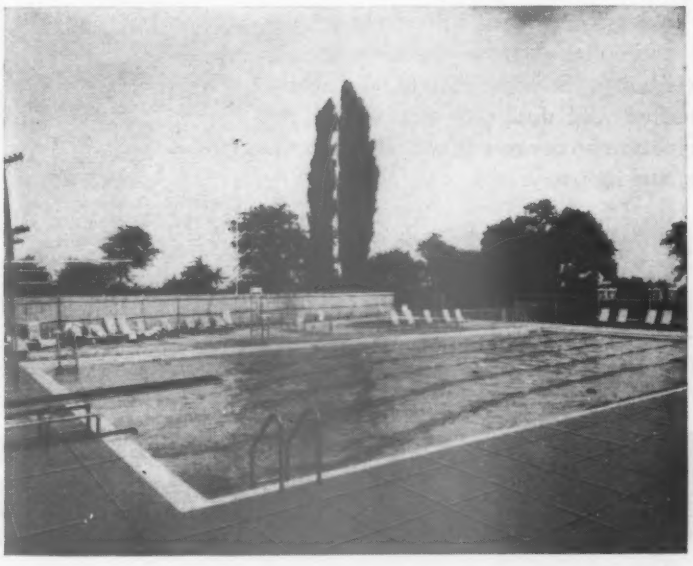

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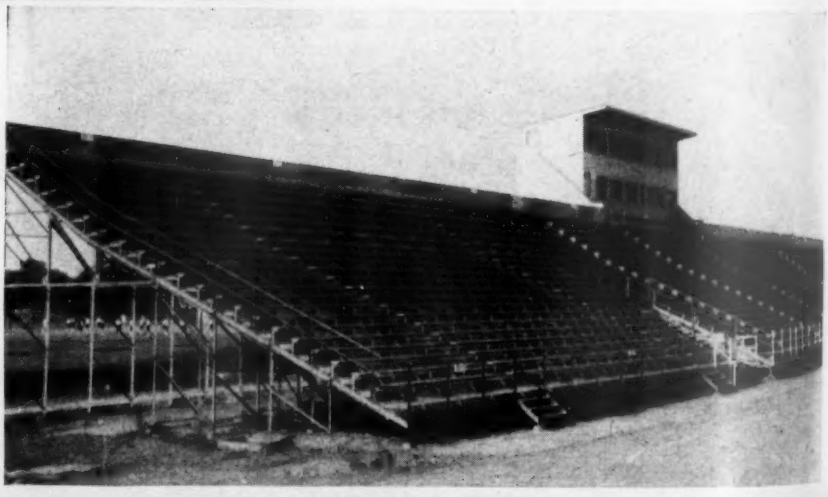

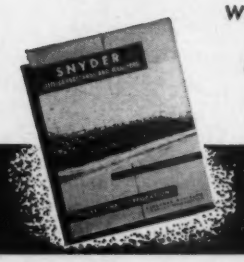

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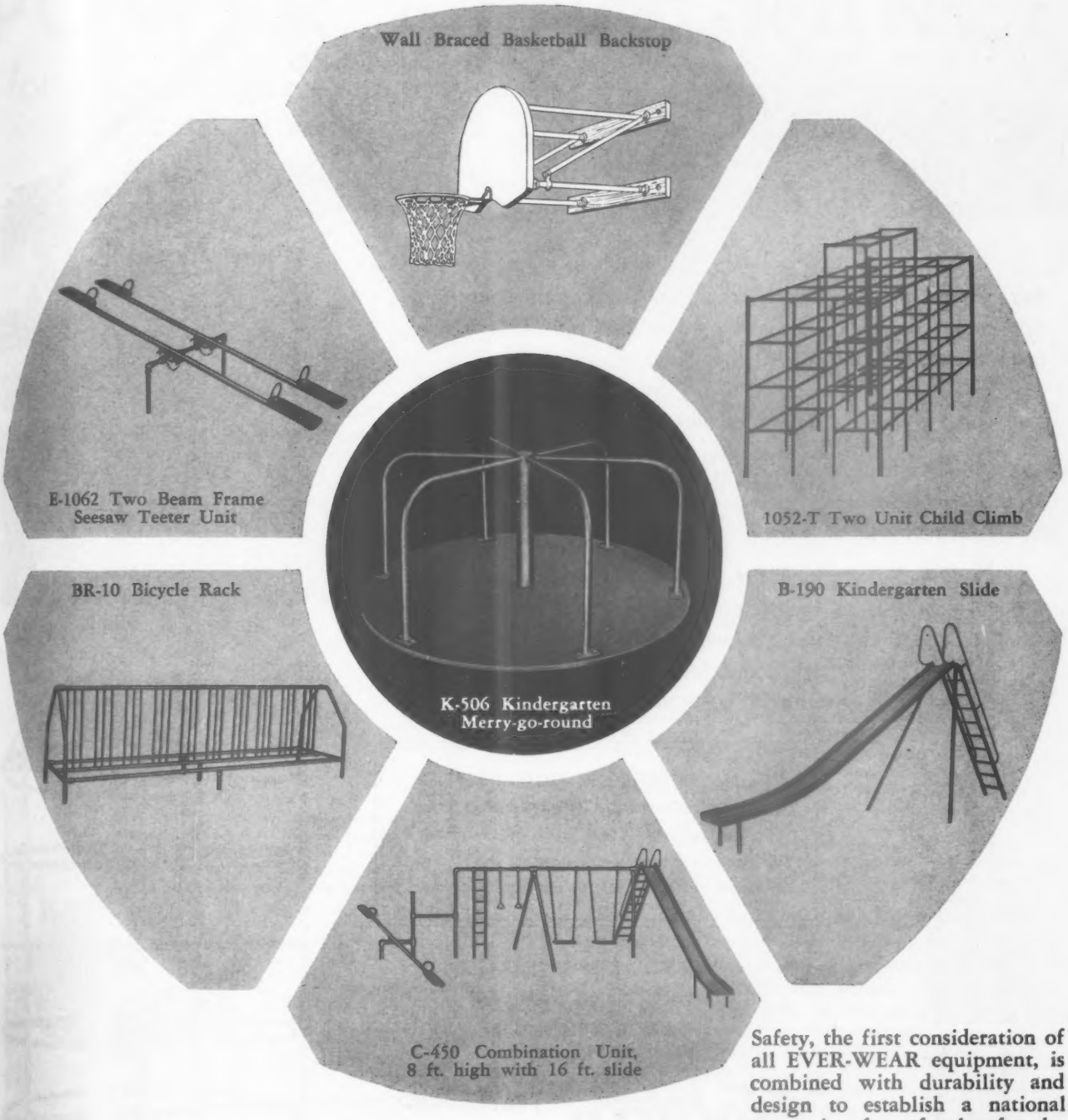
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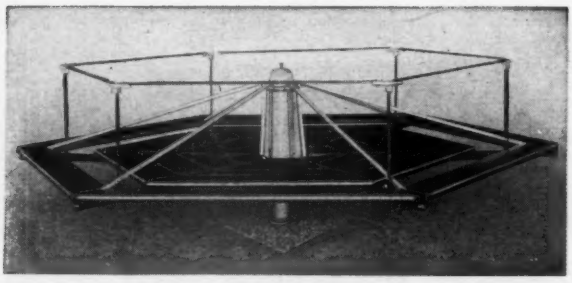

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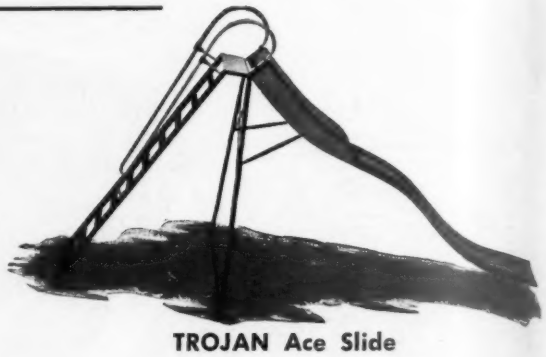

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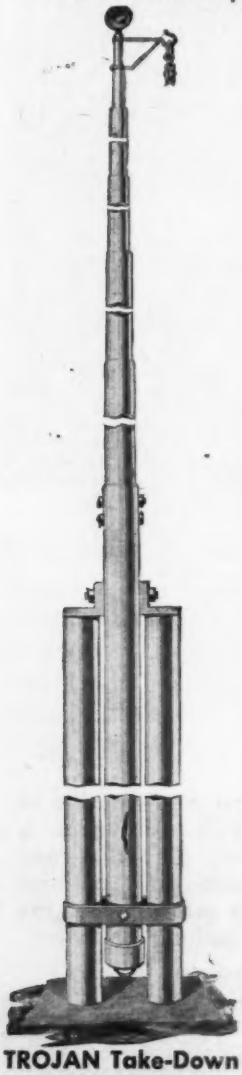

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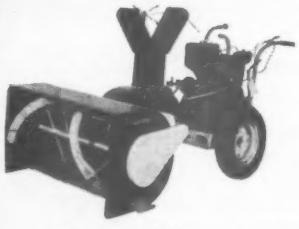
POWER...ENDURANCE

for
- **LONG, HEAVY GRA**
- **STEEP SLOPES**
- **TERRACES**

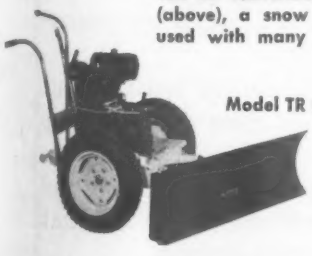
Front discharge eliminates unsightly clumps.

Powerful, ruggedly built, with heavy gauge, reinforced steel frames, Devere mowers, day in and day out, tackle the toughest jobs—sometimes under almost unbelievable conditions. Whether it be mowing heavy grass and weeds in the spring and summer or mulching leaves in the fall, they can be counted on to give dependable, heavy-duty performance at lowest maintenance costs! "Field-proved" by thousands of users in all sections of the country—they can do for you what they have done for others.

Model TR Snow Blower



Since the driving or tractor unit and the cutting unit are separate and quickly detachable—the TR Mower can be converted to a snow blower (above), a snow plow (below) and used with many other attachments.



Model TR Snow Plow

13 DEVERE MODELS

Model TR-60	60" Riding Mower
Model TR-48	48" Riding Mower
Model TR-37	37" Riding Mower
Model 32R	32" Riding Mower
Model 27R	27" Riding Mower
Model 424R	24" Riding Mower
Model 31	31" Self Propelled
Model 31R	31" Self Propelled with Reverse
Model VR31	31" Self Propelled with Reverse
Model 24	24" Self Propelled
Model 24R	24" Self Propelled with Reverse
Model VR24	24" Self Propelled with Reverse
Model 18HD	18" Hand Propelled Heavy Duty Trimmer

There's a Devere mower to fit every mowing requirement . . . thirteen models form the most comprehensive line of rotary mowers in the industry. Thousands of Devere mowers are in daily operation at parks, cemeteries, institutions, schools and colleges . . . your assurance of satisfaction. Write for information.

The original rotary scythe suction-lift mower with a reverse.

DEVERE COMPANY
RACINE, WISCONSIN • U.S.A.

Quality Products Only . . . Since 1922

GRAVELY CLEAN-CUT MOWERS

P. O. Box 752, Dunbar, West Virginia

GRAVELY CLEAN-CUT MOWBILITY

CUTS A WIDER SWATH THROUGH COSTS!

day in, day out . . .

MOWBILITY IN THE MODEL 70

- Rear-wheel drive and steering for *extra* maneuverability.
- Variable speed to five MPH.
- Fast, simple cutting height adjustment.
- Spring-suspended mower unit—it "floats" ahead of the power unit, follows small irregularities in terrain.
- Extra maneuverability—you cut square corners, do U-turns at top speed, get in close to obstacles to eliminate most clean-up trimming.

Gravely Clean-Cut gives you BIG MOWBILITY—

. . . week after week . . .

Free your people for other important work; save man-hours. The Clean-Cut 70 ROTARY GANG MOWER gives you extra power, extra speed, extra maneuverability.

Ride at 5 MPH and cut a swath 70 inches wide. Change your cutting width *while you mow!* Trim, mow, mulch . . . all in one money-saving operation.

Unexcelled maneuverability with unique rear-wheel steering/drive. Mow slopes as steep as 30%!

There's a 35 and a 24 inch rider mower and a self-propelled 20 inch unit, too. See what Clean-Cuts can do for your grounds.

Ask your Gravely Dealer for a FREE demonstration or write for complete FREE LITERATURE to:

GRAVELY CLEAN-CUT MOWERS

P.O. BOX 752 DUNBAR, WEST VIRGINIA

GRAVELY TRACTORS

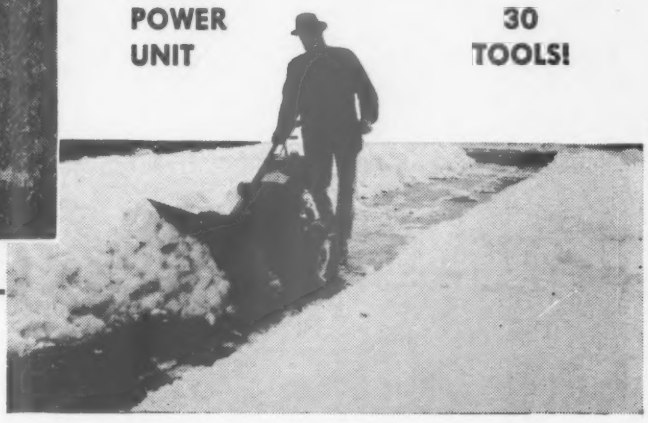
P. O. Box 652, Dunbar, West Virginia

GRAVELY TRACTOR VERSATILITY

KEEPS POWER ON THE JOB —ALL YEAR LONG!

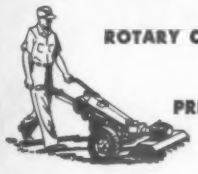
ONE POWER UNIT

30 TOOLS!



CUT EXPENSIVE IDLE TIME— SAVE Because GRAVELY Doesn't Sit—

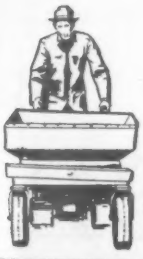
VERSATILE POWER



ROTARY CULTIVATOR ONE OF 3 GROUND PREPARATION TOOLS

ROLLER— ONE OF 9 LAWN CARE ATTACHMENTS

GANGMOWER 75" CUT— ONE OF 4 MOWING TOOLS!



NEW POWER SPREADER

ONE OF 5 ICE AND SNOW REMOVAL TOOLS!

GRAVELY Works!

Why rob your budget by purchasing one-job machines that sit idle until their specialty is called for?

Instead, cut the cost of idle time with Gravely Power Equipment—the power system that does *all* your grounds maintenance jobs, all year long—with ONE power unit!

One 6.6 HP Gravely Tractor powers 30 different tools and attachments . . . power attachments ready to go to work by simply removing and replacing four bolts!

Power & Performance—6.6 HP!

Get more power, more performance, more for your money—Gravely Equipment costs less for the initial purchase, less in maintenance. Because it is priced right—and built to take the toughest jobs, day after day after day!

ALL-GEAR DRIVE, Two speeds forward and REVERSE, Auto-type differential for easy handling.

Positive Proof—Free Demonstration

See the Gravely, in action, at no cost or obligation! Just ask for a FREE Demonstration . . . see the Gravely perform *your* jobs!

FREE—NEW BOOKLET! Request Your Copy Today!

New, 16 page Booklet, "How To Cut Costs For Grounds Maintenance" shows you on-the-job photos, full details of how Gravely does the job better, at less cost! Write Now!

NEW! FREE INDUSTRIAL CATALOG

GRAVELY TRACTORS

P.O.BOX 652 DUNBAR, W.VA.

JACOBSEN MANUFACTURING COMPANY

Dept. AS61, Racine, Wisconsin

Cut the cost of cutting grass with

Jacobsen Turf-King 76

Mow more area faster and have a smoother, finer looking lawn with the new 76 inch Turf-King. The three articulated, power driven reels operate ahead of all wheels, following ground contours, leaving no unsightly ridges. Wing units are retractable for close quarter mowing, will cut at 25 degree angle, up or down.

The Turf-King 76 has outstanding capability to mow side-hill slopes, up or down grades. It has a cutting speed of ¾ to 4 mph and a transport speed of 6 mph. Cutting height is adjustable from ⅜ inch to 2¾ inch. May be equipped at extra cost with dual wheels, electric starter, rollers, hi-cut shoes or side skids. Heavy duty construction means low maintenance, long operating life. Let us arrange a free demonstration by your nearby Jacobsen Dealer and Service Specialist. Send coupon today.

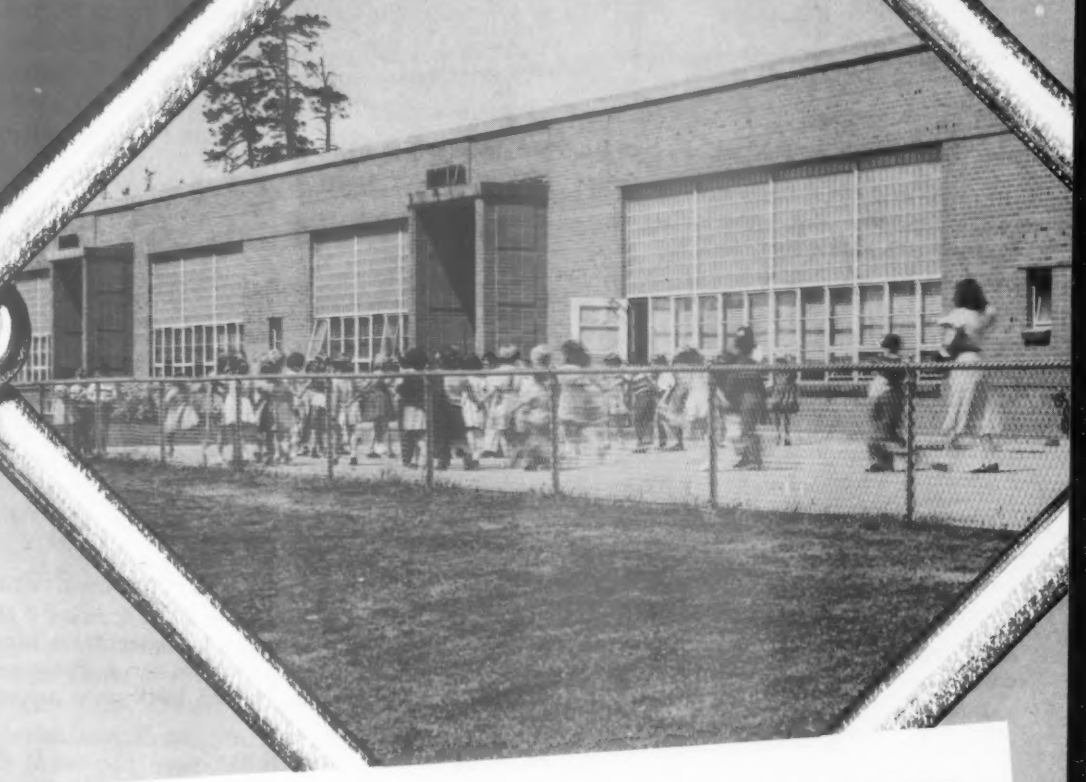
JACOBSEN TURF EQUIPMENT

Jacobsen

MANUFACTURING COMPANY • Dept. AS61 • Racine, Wisconsin

REALOCK
CHAIN LINK FENCE

D-1/Co



FOR EDUCATIONAL INSTITUTIONS AND MUNICIPALITIES

Custom Built

Corrosion Resistant

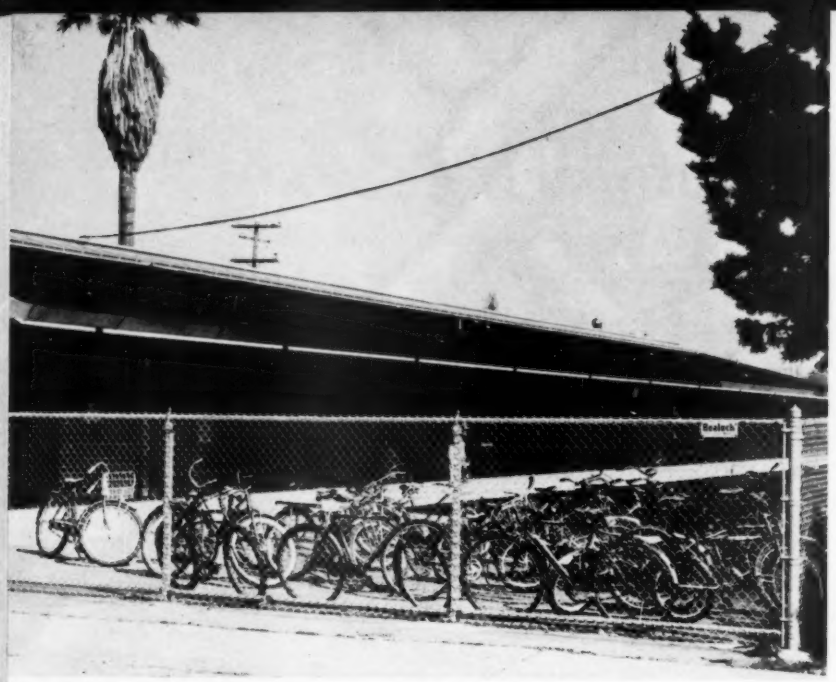
Vandalism, burglary and arson . . . three reasons why all school, institution and municipal properties need the "all-round" protection of a rugged Realock Fence.

This modern fence of heavily galvanized steel is built to give a lifetime of maintenance-free service around public and private schools, hospitals and institutions . . . reservoirs . . . municipal parking areas . . . playgrounds . . . parks . . . swimming pools . . . airports . . . golf courses . . . tennis courts—and any other areas where property protection and limited access are of prime importance.

For a free estimate, covering complete installation by expert erection crews, consult your classified directory or contact our nearest sales office.

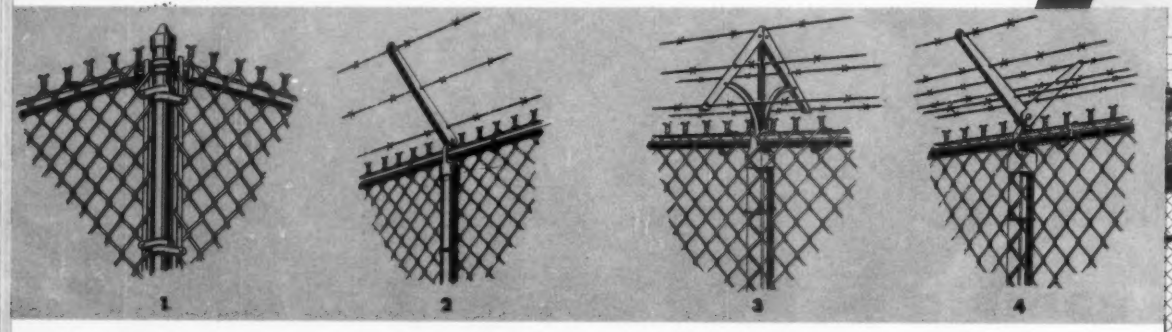
RE

A one-time



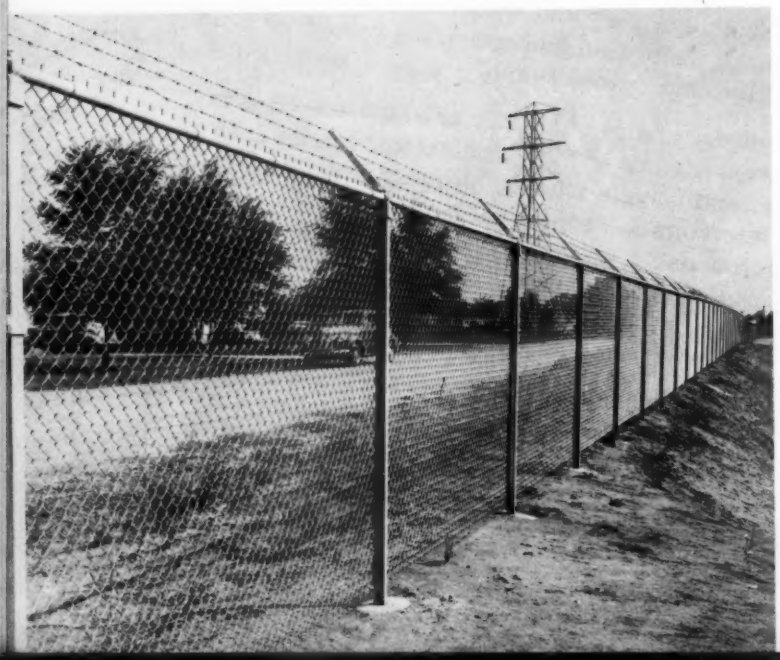
Types 320 and 320H (light construction) standard heights 3′ to 6′ inclusive.

Types 420 and 420H (heavy construction) heights up to and including 12′ —without barbed wire, ideal for residences, schools, parks and for some industrial and institutional use.



(1) 420 without barbed wire topping; (2) 423 with 3 strand construction; (3) 425 with 5 strand construction; (4) 426 with 6 strand construction.

Types 425 and 426 with 5 or 6 strands of barbed wire, will assure the ultimate in protection from both sides of the fence. For complete specifications refer to back cover page.



Realock Gates—either slide or swing type; height as fence. Openings from 2 to 75 feet Gates are constructed of full weight tubular steel filled with fabric matching that of the fence.

Types 323 and 323H (light construction) standard heights 6′ and 7′.

Types 423 and 423H (heavy construction) standard heights up to and including 13′—3 strands of barbed wire—provides effective protection for industrial, institutional and utility properties, and any other locations where limited access is desirable.

LOCK FENCE

tment . . . for long-term protection

Realock Chain Link Fence offers positive protection for any area where limited access is important. It is the only fence with all essential fittings accessible only from the inside, making destruction of the tough Realock Fabric necessary to gain forcible entry. Its mere existence discourages illegal entrance attempts. Arson, theft, vandalism and trespassing are virtually eliminated. You can be sure that any area protected by a rugged Realock Fence has maximum security and privacy.

But a Realock Fence not only gives security —it can reduce the costs of conventional protection. Fewer watchmen are needed and patrol requirements are reduced to a minimum. Maintenance costs are practically non-existent —Realock's fabric, fittings and posts are weather-resistant. A Realock Fence requires minimum maintenance; it withstands the severest storms; and it cannot rot or decay. Realock Fence is built for a lifetime of service.

✣ ✣ ✣ ✣ ✣

STEEL FABRIC. Realock Fabric is woven from top-quality steel wire, and is thoroughly galvanized *after* weaving by the hot-dip process, which insures a heavy, uniform coating over its entire surface.

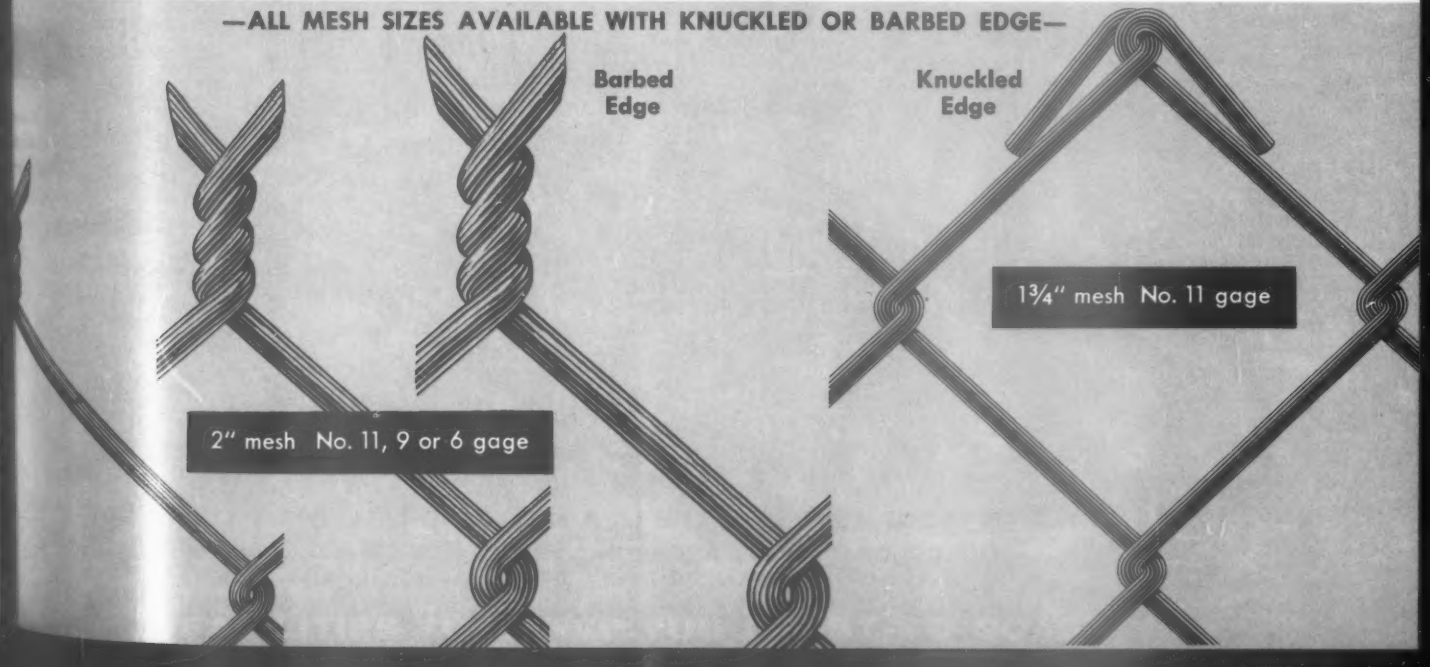
SELVAGE. For heights up to and including 4', the standard selvage is barbed one edge and knuckled one edge. For heights 5' and higher, both edges barbed. Specials can be furnished with both ends knuckled or a combination of both.

POSTS, FITTINGS AND GATES. Terminal posts are constructed of full weight tubular steel. Line posts are H-beam sections or full weight tubular posts. Gate frames are full weight round or square tubular steel. Top rails are tubular pipe. Gates, complete with hinges, locking device and stops, are furnished in widths and heights to suit your needs. All gates, posts and fittings are heavily galvanized.

BARBED TOPS. Barbed wire construction on top of fence offers greatest protection. Barbed wire top finish comes in 3, 5 or 6 strands, supported on arms above the fabric.

Each Realock Fence is furnished as a specially engineered, custom-built installation that assures maximum protection with a minimum of maintenance. Realock engineers are always ready to work with you in planning enclosures best suited to your needs. Consult your classified directory or contact our nearest office (listed on the back cover) for more information. A representative will call to discuss your requirements . . . without obligation, of course.

—ALL MESH SIZES AVAILABLE WITH KNUCKLED OR BARBED EDGE—



● specifications

USE	OVERALL HEIGHT	TYPE NO.	STRANDS OF BARBS	SIZE OF RAIL OR COILED SPRING WIRE	SIZE OF LINE POST	END OR CORNER POST	SIZE OF MESH	GAGE OF WIRE
INDUSTRIAL—INSTITUTIONAL	5′-6′-7′-8′-9′ 10′-11′-12′-13′ (See Note)	426H* 425H 423H* 420H*	6 5 3 0	1⅝″ O.D. Pipe (2.27 # Lin. Ft.)	2¼″ H-(4.1 # Lin. Ft.)	3″ O.D. (5.79 # Lin. Ft.)	2″	No. 9 or No. 6
	6′-7′	323H*	3		1⅞″ H-(2.8 # Lin. Ft.)	2½″ O.D. (3.65 # Lin. Ft.)		
	5′-6′-7′-8′-9′ 10′-11′-12′-13′ (See Note)	406H* 405H 403H* 400H*	6 5 3 0	No. 7 Coiled Spring Wire	2¼″ H-(4.1 # Lin. Ft.)	3″ O.D. (5.79 # Lin. Ft.)		
	6′-7′	303H*	3		1⅞″ H-(2.8 # Lin. Ft.)	2½″ O.D. (3.65 # Lin. Ft.)		
	5′-6′-7′-8′-9′ 10′-11′-12′-13′ (See Note)	426 425 423 420	6 5 3 0	1⅝″ O.D. Pipe (2.27 # Lin. Ft.)	2½″ O.D. (3.65 # Lin. Ft.)	3″ O.D. Pipe (5.79 # Lin. Ft.)		
	6′-7′	323	3		2″ O.D. (2.72 # Lin. Ft.)	2½″ O.D. (3.65 # Lin. Ft.)		
	5′-6′-7′-8′-9′ 10′-11′-12′-13′ (See Note)	406 405 403 400	6 5 3 0	No. 7 Coiled Spring Wire	2½″ O.D. (3.65 # Lin. Ft.)	3″ O.D. Pipe (5.79 # Lin. Ft.)		
	6′-7′	303	3		2″ O.D. (2.72 # Lin. Ft.)	2½″ O.D. (3.65 # Lin. Ft.)		
RESIDENTIAL		320H* 310H* 300H*	0 0 0	1⅝″ O.D. Pipe (2.27 # Lin. Ft.) 1⅜″ O.D. Pipe (1.68 # Lin. Ft.) No. 7 Coiled Spring Wire	1⅞″ H-(2.8 # Lin. Ft.)	2½″ O.D. Pipe (3.65 # Lin. Ft.)	2″	No. 9 or No. 6
	3′-3′6″ 4′-5′-6′	320 310 300	0 0 0	1⅝″ O.D. Pipe (2.27 # Lin. Ft.) 1⅜″ O.D. Pipe (1.68 # Lin. Ft.) No. 7 Coiled Spring Wire	2″ O.D. Pipe (2.72 # Lin. Ft.)			
	3′-3′6″-4′	210 200	0 0	1⅜″ O.D. Pipe (1.68 # Lin. Ft.) No. 7 Coiled Spring Wire	1⅝″ O.D. Pipe (2.27 # Lin. Ft.)	2″ O.D. Pipe (2.72 # Lin. Ft.)		No. 9 or No. 11
		T1** T0**	0 0	1⅜″ O.D. Pipe (1.68 # Lin. Ft.) No. 7 Coiled Spring Wire	"T" (1.33 # Lin. Ft.) "T" (1.33 # Lin. Ft.)			
TENNIS COURTS	8′-10′-12′	420H 420 310	0 0 0	1⅝″ O.D. Pipe (2.27 # Lin. Ft.) 1⅝″ O.D. Pipe (2.27 # Lin. Ft.) 1⅜″ O.D. Pipe (1.68 # Lin. Ft.)	2¼″ H-(4.1 # Lin. Ft.) 2½″ O.D. (3.65 # Lin. Ft.) 2″ O.D. (2.72 # Lin. Ft.)	3″ O.D. (5.79 # Lin. Ft.) 3″ O.D. (5.79 # Lin. Ft.) 2½″ O.D. (3.65 # Lin. Ft.)	1¾″	No. 11

*These types can be furnished in the mid-continent area with fabricated line posts. Such types are followed by suffix "HF" instead of "H".

**Not furnished by the Wickwire Division.

All posts set in concrete. For posts set in concrete walls or rock, a depth equal to 4 times diameter is recommended. Except Type T1.

Note: In Types 400H-420-400 maximum height of 12′ is standard.

● gate frames and posts

TYPE OF FENCE	GATE OPENINGS		GATE	
	Single	Double	Frame	Post Size & Weight
T1 —TO 210 —200 310 —300	Up to 6′ Up to 6′ Up to 6′	Up to 12′ Up to 12′ Up to 12′	1⅛″ O.D. 1⅛″ O.D. 1⅜″ O.D.	2″ O.D.-2.72 # Lin. Ft. 2″ O.D.-2.72 # Lin. Ft. 2½″ O.D.-3.65 # Lin. Ft.
320 —300 323 —303	Up to 4′ Over 4′ to 8′	Up to 8′ Over 8′ to 16′	1⅝″ O.D. 1⅝″ O.D.	2½″ O.D.-3.65 # Lin. Ft. 3″ O.D.-5.79 # Lin. Ft.
420 —400 420H—400H 423 —403 423H—403H 425 —405 425H—405H 426 —406 426H—406H	Up to 6′ Over 6′ to 13′ Over 13′ to 18′ Over 18′	Up to 12′ Over 12′ to 26′ Over 26′ to 36′ Over 36′	2″O.D.	3″ O.D.-5.79 # Lin. Ft. 4″ O.D.-9.10 # Lin. Ft. 6⅝″ O.D.-18.97 # Lin. Ft. 8⅝″ O.D.-24.60 # Lin. Ft.

● footing chart

TYPES		Line Post		End & Corner		Gate Post	
	Height of Fence	Dia. at Top	Depth	Dia. at Top	Depth	Dia. at Top	Depth
T1-210-310-320	To 4′	8″	24″	10″	30″	10″	30″
310 Tennis	To 12′	10″	36″	12″	36″	12″	36″
320-420-310H	To 4′	10″	24″	12″	30″	12″	30″
323-323H	To 7′	10″	36″	12″	36″	12″	36″
420-420H	5′ to 12′	10″	36″	12″	36″	12″	36″
423-423H	5′ to 12′	10″	36″	12″	36″	12″	36″
425-425H	5′ to 12′	10″	36″	12″	36″	12″	36″
426-426H	5′ to 12′	10″	36″	12″	36″	12″	36″
6⅝″ & 8⅝″						16″	48″

The above table is for standard construction. Special ground conditions may develop, requiring special size holes.

REALOCK FENCE

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION — Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION — Buffalo, New York

BRANCHES IN KEY CITIES

F-929 Rev. 22.5M 4/61 DKM-PP

Printed in U.S.A.

D-3/Pi

SAFE *seating with the strength of steel*

VERSATILE *unit-section construction*

ECONOMICAL *in installation*

PERMANENT *investment value*

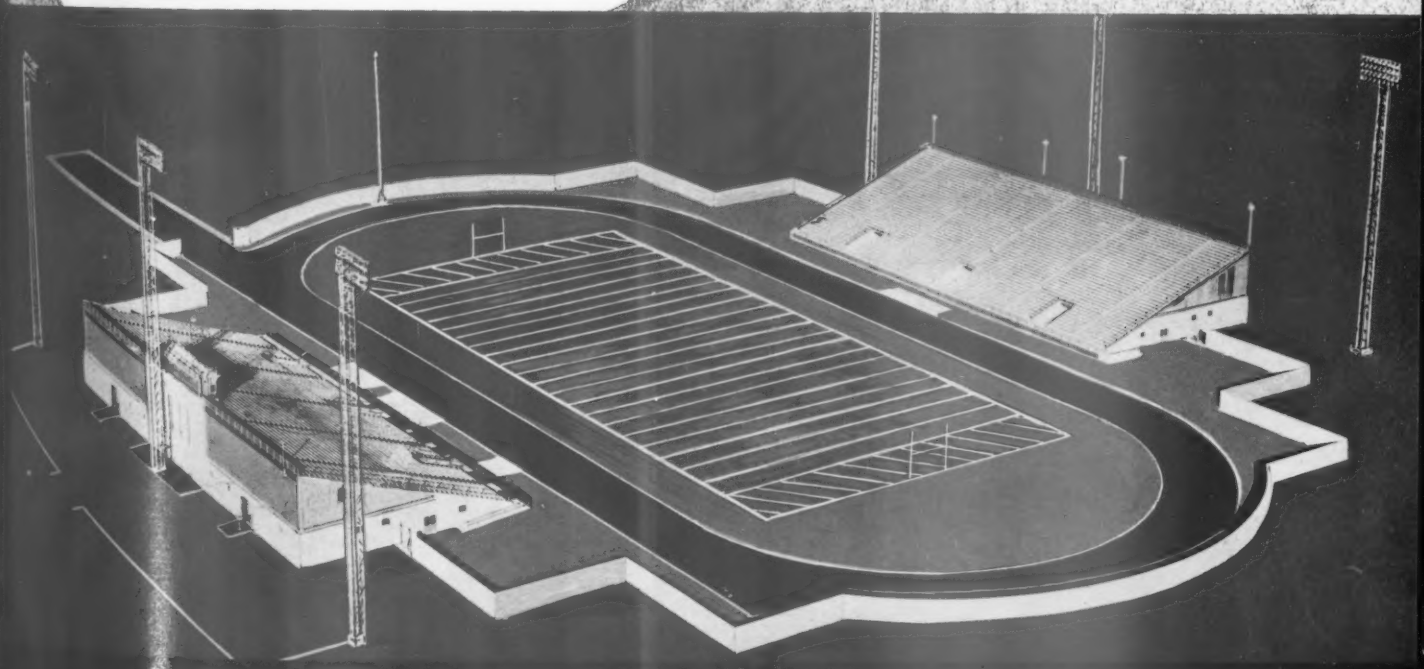
plus

complete design flexibility

PDM STEEL GRANDSTANDS

STEEL GRANDSTANDS by Pittsburgh-Des Moines

for schools and colleges everywhere



FACILITIES TO SERVE YOU COAST-TO-COAST

Pittsburgh-Des Moines
STEEL GRANDSTANDS

Outstanding Advantages:

SAFE—The first requirement of spectator seating—absolute safety—is met to the full by PDM Steel Grandstands. They conform easily to the most rigid building codes.

KNOWN PHYSICAL FACTORS—No hidden elements. The stand is built of steel with definite, uniform physical properties, to strict applicable codes. Strength and soundness are clearly evident.

STURDY—Steel plates form the deck. Strong steel columns, beams and braces support it, with ample reserve strength for unusual stress conditions.

WATERTIGHT—Weatherproof steel deck permits use of underneath area for dressing rooms, toilets, concessions, storage, etc.

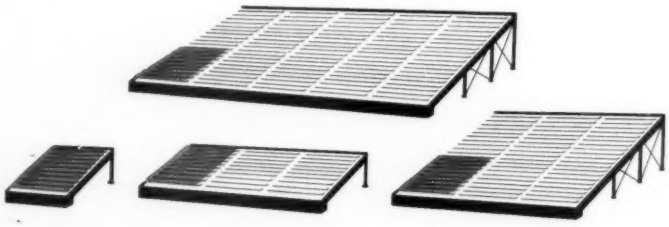
PREFABRICATED—All components of stand are factory-fabricated, permitting simple field construction.

UNIT SECTIONS—Unitized design with standard sections enables construction of stands of any size or arrangement, with easy expansion of capacity at any time.

PERMANENCE—The properly-maintained steel stand does not age. It is immune to weather and season—can look like new for a lifetime of service.

ELASTICITY—The steel stand undergoes necessary contraction and expansion without change in steel properties, ideal in severe climatic or earthquake areas.

MOBILITY—PDM Stands are easy to dismantle and re-erect at different locations, when desired.



Basic design factors

With a basic standard unit section 18 feet long and 10 rows deep, your PDM Stand can be any number of sections long by any number of sections deep—individually engineered to fit your layout. Stands can be on one or both sides of the field, horseshoe-shaped, or full oval. Sections may be added at any time to increase capacity in width, depth, or both—always presenting a finished and substantial appearance.

University of Wyoming, Laramie, Wyo., 15,000 seats.

University of Tulsa, Tulsa, Okla. 5,500 seats.

Woodrow Wilson High School, Long Beach, Cal. 2,000 seats.

South Stand, High School, Mt. Lebanon, Pa. 3600 seats

West Stands, High School, Dayton, Ohio. 5,000 seats.

Expansibility

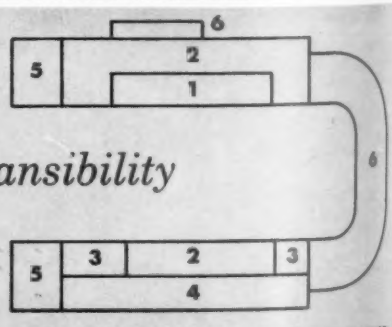
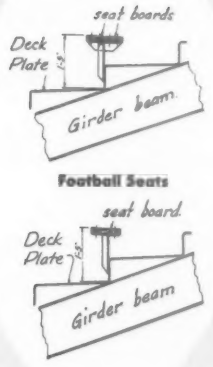


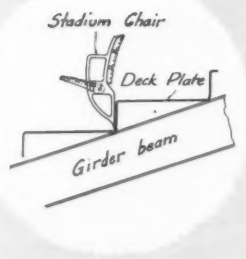
Diagram shows actual 6-step expansion sequence of Pennsylvania State University's PDM Stand from 2400-person capacity in 1934 (1) through additions in 1936 (2), 1937 (3), 1939 (4), 1948 (5) and 1949 (6) to a capacity of 30,000. In 1959-60, the entire structure was dismantled, moved to a new field and expanded to 45,000 capacity, as shown in aerial photo at left.

Seat spacing and aisle widths

In stadium layout, seat and row spacing must be considered carefully. Leg room must be sufficient, and seat spacing correct for requirements. For bleacher seats, standard *tread width* is 24″. When stadium chairs are desired for box seats or baseball, a tread width of 27″ to 30″ should be used. *Seat width* for bleachers can be 16½″ or 18″. The narrower width is recommended for mixed adult and children attendance—the 18″ width for adults predominately, as in college stands. *Aisles* vary from 3′ minimum. *Aisle spacing:* length of rows should not exceed 51′ for bleacher seating, nor 36′ when chairs are used. *Standard riser* is 8½″, consisting of 7½″ in riser and 1″ tread slope for drainage. Special situations may require greater slopes.



Football Seats



Baseball Seat Type

Weathertight Steel Deck—a bonus value for economical underdeck development

Shower and locker room facilities.

Equipment storage, etc.

Pittsburgh-Des Moines Steel Deck grandstands provide a weathertight roof over the underdeck area, permitting economical utilization of the space for locker rooms, concession stand, storage rooms, etc.

Concession stands, telephones, ticket booths.

Specification points to check

General—Description of Grandstand, including length, number of rows, and seating capacity desired. Location of site.

Design and workmanship—Design shall be in accordance with the best modern engineering practices. Workmanship shall be equal to the best modern practices, and of such quality as to produce in construction the full strength intended by the designer.

Loadings—The following types of loading must be considered in grandstand design: Dead load. Live load on seats, deck and supporting structures. Sway load (a) in a direction perpendicular to the length of the seats, and (b) in a direction parallel to the length of the seats. Wind load, on a vertical projection of the stand including railings, (a) when stands are fully loaded, and (b) when stands are empty.

Foundations—Give soil conditions. Give depth of frost.

Materials of construction—Steel shall conform to the Standard Specifications of the American Society for Testing Materials (ASTM) and the American Institute of Steel Construction (AISC) for buildings and other structural steel. Give minimum thickness of components. Lumber for seat boards shall be white oak, or vertical grain quarter-sawed fir lumber, finished two sides and two edges with "eased" top corners. Other material shall be suitable, of uniform quality, and without defects affecting the strength or service of the grandstand.

Allowable Stresses—All steel components of the structure shall be so proportioned that the stress shall not exceed the value set forth in the AISC Specification. Other materials where used shall be so designed and proportioned that their stresses shall not exceed the allowable unit stresses generally accepted as safe by engineering practices.

Special Requirements—The grandstand shall be of solid steel deck plates supported by steel girders, columns and bracing. Deck plates shall be flanged or bent into steps for stiffness and shall be shingle-lapped and bolted or welded to make the deck weather tight. The treads shall be not less than 24″ wide and sloped for drainage. Height of riser shall be not less than 7″. The seat lumber shall be securely bolted to steel pedestal supports spaced about 4′6″ center to center. The seat height shall be 17″ above steel treads. A steel apron plate shall be provided along front of stand extending from front treads down to within 4″ of the ground. One steel flashing plate shall be provided for each end of stand and each side of wells. These plates shall be attached to deck plates to conceal both the girders and the end of deck plates.

Hand Rails—Hand rails conforming to local safety codes shall be provided along the front, both ends and the rear of the stand, and for ramps, stairs and wells.

Aisles—consult local building codes. Spacing of aisles (a) seats without backs, (b) seats with backs. Width of aisles. Distance between seats: the horizontal distance back-to-back of seats shall be not less than 24″.

Welds—shall be made only by operators who have been previously qualified by test, as prescribed in the "Standard Qualification Procedure" of the American Welding Society to perform the type of work required, except that this provision need not apply to tack welds not later incorporated into finished welds carrying calculated stress.

Painting—The paint shall consist of two coats applied to all surfaces and one additional coat on top of deck of stand. The first coat shall be applied at place of manufacture. During the application of the first field coat clean white silica sand shall be applied to top of deck. After this paint has dried the excess sand shall be removed by sweeping or blowers and an additional coat of paint applied.

Pittsburgh-Des Moines Steel Grandstands

Pittsburgh-Des Moines Steel Deck Grandstands

HOW TO CALCULATE SEATING CAPACITY

A standard PDM Steel Deck Grandstand may be any length which is a multiple of 18′-0″, and any number of rows deep. In calculating the seating capacity of a grandstand, allowance must be made for the space required for aisles, entrance wells, etc. It is therefore assumed that an average of only 16′-6″ of the 18′-0″ length of each bay will be used for seating. For example, an 18′-0″ x 10 row section will provide 120 seats 16½″ wide or 110 seats 18″ wide. The seating capacity of a straight stand may be calculated as follows:

FOR 16½″ SEAT WIDTH
Number of seats = length of stand in feet x number of rows x (12/18)

FOR 18″ SEAT WIDTH
Number of seats = length of stand in feet x number of rows x (11/18). The seating capacities listed in the following table are based on 16½″ seat widths. If the stand is to be laid out for 18″ seats, the seating capacities listed in the table are reduced by 8⅓ per cent. For a stand having a number of rows not shown in the table, interpolate to determine the capacity of the stand. For example, a 25 row stand x 180′-0″ long will provide 3000 seats of 16½″ width.

All-steel press box.

Sturdy steel deck.

Protected, rubbish-free underdeck area.

TABLES

CAPACITY TABLES FOR VARIOUS STAND LENGTHS AND DEPTHS

Length of Stand—in Feet.....		18′ 0″	36′ 0″	54′ 0″	72′ 0″	90′ 0″	108′ 0″	126′ 0″	144′ 0″	162′ 0″	180′ 0″
Depth of Stand	10 Rows (20′ 0″)....	120	240	360	480	600	720	840	960	1080	1200
	20 Rows (40′ 0″)....	240	480	720	960	1200	1440	1680	1920	2160	2400
	30 Rows (60′ 0″)....	360	720	1080	1440	1800	2160	2520	2880	3240	3600
	40 Rows (80′ 0″)....	480	960	1440	1920	2400	2880	3360	3840	4320	4800
	50 Rows (100′ 0″)....	600	1200	1800	2400	3000	3600	4200	4800	5400	6000
	60 Rows (120′ 0″)....	720	1440	2160	2880	3600	4320	5040	5760	6480	7200

Length of Stand—in Feet.....		198′ 0″	216′ 0″	234′ 0″	252′ 0″	270′ 0″	288′ 0″	306′ 0″	324′ 0″	342′ 0″	360′ 0″
Depth of Stand	10 Rows (20′ 0″)....	1320	1440	1560	1680	1800	1920	2040	2160	2280	2400
	20 Rows (40′ 0″)....	2640	2880	3120	3360	3600	3840	4080	4320	4560	4800
	30 Rows (60′ 0″)....	3960	4320	4680	5040	5400	5760	6120	6480	6840	7200
	40 Rows (80′ 0″)....	5280	5760	6240	6720	7200	7680	8160	8640	9120	9600
	50 Rows (100′ 0″)....	6600	7200	7800	8400	9000	9600	10200	10800	11400	12000
	60 Rows (120′ 0″)....	7920	8640	9360	10080	10800	11520	12240	12960	13680	14400

The wide experience of our grandstand engineers in solving outdoor seating problems is at your service upon request—from counsel in site selection, through general design of stand and economical layout to the details of accessory and auxiliary facilities. Write or telephone our nearest office.

PDM
STEEL GRANDSTANDS

Pittsburgh-Des Moines Steel Co.

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PROVO, UTAH • CASPER, WYO. • SANTA CLARA, FRESNO, STOCKTON, CALIF.

PITTSBURGH (25) ..... Neville Island
WARREN, PA. ..... P. O. Box 660
BALTIMORE (26) P. O. Box 3459, Curtis Bay Station
BIRMINGHAM (8) .. P. O. Box 8641, Ensley Station
DES MOINES (8) ..... 1015 Tuttle Street
PROVO, UTAH ..... P. O. Box 310
SANTA CLARA, CALIF. ..... P. O. Box 329
EL MONTE, CALIF. ..... P. O. Box 2012
NEW YORK (17) ..... 200 East 42nd Street
NEWARK (2) ..... 744 Broad Street
CHICAGO (3) ..... 679 First National Bank Bldg.
ATLANTA (5) ..... 361 East Paces Ferry Rd., N.E.
DALLAS (1) ..... Suite 1703, Southland Center
DENVER (2) ..... 323 Railway Exchange Bldg.
SEATTLE (1) ..... 500 Wall Street

Litho in

How to Use this Equipment and Supplies Reference Material:

Editorial material and products which relate directly to the equipment and supplies used within educational buildings are classified in eight major areas:

E Instructional Equipment and Supplies
F Furniture
G Laboratory, Shop, Homemaking, Science
H Auditorium, Theater, Music, Art
J Food Service, Dormitory, Residence
K Business Education, Office and Administration
L Health, Physical Education, Recreation, Student Services
M Maintenance Equipment and Supplies

Pink divider cards separate these main groupings. Articles by authorities in their fields precede each division and these valuable reference sources complement the advertising information which follows. There are two kinds of advertising for each section. First come single page advertisements arranged according to the product grouping. Next are comprehensive catalogs, two pages or more each in length.

You will find, then, that each divider card is immediately followed by selected editorial matter, then by individual advertisements, then by catalogs. The combination of editorial material and product information is especially planned for your convenience of use and reference. Additional aids in locating a product or a specific manufacturer are our yellow pages:

Index to Advertisers . . . . . page I
Classified Product Index . . . . . page V

The indexes are complete guides to the companies represented in the yearbook and to their products. All are identified by section letter. Catalogs also bear a company's initial letters. Single page advertising bears a page number following the sequence of the editorial pages.

If you need more information on any product, use our green Reader Service cards, postage-paid. Your inquiries will receive prompt attention.

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E INSTRUCTIONAL EQUIPMENT AND SUPPLIES

EDITORIAL

Selection and Handling of Instructional Materials — E 1

ADVERTISING

Projectors, Recorders-Players, Cameras, Television

Argus Cameras, Inc., Sub. of Sylvania Electric Products Inc. — E 7
Philco Government and Industrial Group — E 10
Radio Corporation of America — E-1/RCA
Rheem Califone Corporation — E 8, 9
Victor Animatograph Corporation, A Division of Kalart — E-1/Ka

Teaching Machines, Programs, Language Laboratories

Encyclopaedia Britannica Films — E 11
Metal Works, Inc. — E 12
Rheem Califone Corporation — E 13
Thompson Ramo Wooldridge Inc. — E 14

To get the most value from your copy of AS&U—use the green-colored Reader Service post cards to get further information on specific products and manufacturers.

Mail bags deliver instructional materials to Tucson's schools on a regular schedule.

Selection and Handling of Instructional Materials

by Wendell Eckholm
Director, Instructional Aids Department, Tucson Public Schools, Arizona

A native of Iowa, Mr. Eckholm has a B.A. degree from Grinnell College and an M.S. from University of Southern California. He has served also as a public school teacher and principal.

THERE IS NO magic formula for the numbers and kinds of instructional materials needed in today's classrooms. We have modern students in our schools and it takes modern tools to teach them. Filmstrips, slides, films, displays, dioramas, specimens, models, charts, pictures, prints, maps, records and tape recordings have become an essential part of the teaching process.

In Tucson we recognize the spread of student interests and abilities and supply teachers in our 65 schools with many kinds of instructional materials. Purchasing, storing and distribution of these materials are the tasks of the Instructional Aids Department, located in the Education Center. The department cooperates with teachers, supervisors and administrators in making teaching effective and is a true resource center.

Research shows that wise use of audio-visual materials results in an increase in the amount, speed and retention of learning. There are many materials available—which should be purchased?

Behind any purchase is consideration of the potential user's preference. Which instructional materials do teachers and supervisors want for their classes? What aids are valuable in their work? What is lacking? Many committees and administrators purchase teaching aids that are rarely used. If teachers help to select materials, there is greater assurance that they will use them. Buy tools for teaching, not curios or museum objects.

Preview and evaluation of new instructional materials are part of the purchasing procedure. Committees of teachers and supervisors can preview materials but the best method is actual tryout in the classroom. Then students can contribute to realistic appraisal.

Keep Up With the Market

Keep up with new materials on the market as part of wise buying. Look upon vendors as co-

partners in the business of education and high pressure selling techniques for new and untried materials will diminish. Such an attitude promotes a better relationship with salesmen and greater understanding by them of educational needs. Establish definite times throughout the year when commercial firms may display their new products at your school district. The previewing process will thus be systematic and will result in careful comparison and selection.

Information about new types of educational materials does not always come from the manufacturer or distributor. Staff members may learn about new items when they attend workshops and summer classes. New teachers in a school system bring new ideas about teaching materials with them. These two sources offer guidance on valuable materials not locally available.

Long-range planning will assure necessary additions to basic materials. Well kept records simplify replacement and duplication of desired materials.

Before actual buying takes place, these questions must be answered. Should items be purchased or rented? Are they available on a free basis from school-related community groups? Are they available from industry, government surplus or other free sources? Should materials be purchased in sufficient quantity to allow placement in each building or purchased for circulation from a central materials center? Answers to these questions should certainly be considered before any money is spent. Local situations will also govern how much money is to be allowed for purchase of new instructional materials. The trend is toward an increasing budget. One percent of the total school budget has been suggested as a practical annual expenditure for new materials.

After the purchase of new instructional materials comes the problem of getting them into the hands of teachers. No matter how complete a collection of teaching aids the central department may have, it will not serve its purpose unless a workable distribution plan is developed. Instructional materials must be available to a teacher when she needs them and where she needs them. This means they must be on a request basis with a dependable distribution system.

It is not always possible or practical for every teacher to have at hand all materials needed in the classroom. A central instructional materials center is perhaps the most satisfactory way of supplying several schools with teaching materials. The success of such a center can be measured by the efficiency of its distribution system. This service is mandatory if the department is to be a resource center rather than a museum.

Distribution includes receiving as well as sending of new materials. Items must flow smoothly to and from the teacher, getting back on time for

Instructional Aids Department in the Tucson Education Center houses and distributes new instructional materials. Charging desk, above, maintains complete records of materials and users.

Diorama of a jack rabbit is available to the schools.

further distribution. Circulation of materials is aided by the following:

1. A catalog listing available materials.
2. An ordering and scheduling procedure that encourages, rather than discourages, use of materials.
3. Dependable delivery and pick-up service on a scheduled basis.
4. Opportunity for teachers personally to select, check out and return materials.

Teachers cannot use materials they do not know about, and the catalog serves as their contact with the center. Revisions, supplementary lists and other additions to the catalog will make it unwieldy in time. Complete revision at least every two years is a must. The catalog should include the philosophy and purpose of the materials center, suggestions for effective use of materials, information on loan periods and renewal privileges, information on delivery and pick-up service, a convenient listing of instructional materials and an explanation of the ordering process with samples of order forms.

In our catalog, materials are listed in three sections. Section one has projected materials like filmstrips, slides and films. Display materials—dioramas, specimens, models, charts, handling displays, flat pictures, maps and museum objects—are in section two. Section three has records, transcriptions, tape recordings and other recorded materials.

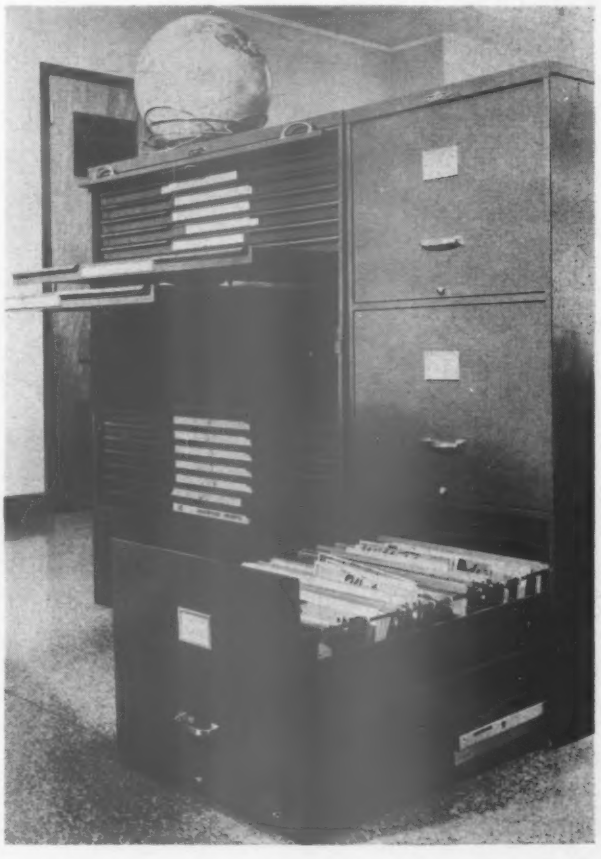
All items are grouped by subject headings; recorded matter is also listed alphabetically. A catalog number is assigned to each title to promote accuracy in filling orders. Suggestions are also presented for best utilization of materials.

Red tape and complicated order forms discourage wide use of instructional materials. Simplify forms as much as possible. Have teachers indicate the grade or subject area taught. This helps in making substitutions or suggestions for related materials that the teacher may wish to use. Route the request to the building audio-visual coordinator. He can prepare any equipment that may be needed and indicate related materials. Return a copy of the original order to the teacher, confirming the dates requested or setting necessary alternate dates.

We keep materials flowing to and from the Tucson schools by daily mail service. The mail schedule is timed and posted in each building so teachers will know when to expect and when to return their materials. Mail sacks go out from a central mail room by noon daily. Heavy objects, such as dioramas, are delivered in the afternoon. Materials should be protected during circulation. Funds spent on protective cases will more than pay for themselves.

The best distribution plan of all is pick-up directly by teachers. An opportunity to see and preview items described in the catalog promotes wise selection. In our large district, 243 square miles, it is not always possible for teachers to do this during working hours. Our department is open

Specially sized storage cases hold pictures and posters.



Listening rooms adjoin record storage room at Tucson Materials Center. Storage bins, below, were constructed by the school carpenters for large objects.

over the noon hour and on Tuesday evenings for the convenience of teachers who want to contact us by telephone or come to the center.

Storing New Materials

Some instructional materials are best stored and distributed by a central department. However, to house all new aids acquired for the school system in such a department would be undesirable. A school may have an audio-visual department or library area where instructional materials and teaching aids are kept, but basic items may be housed in classrooms.

Many learning activities take place in the classroom and storage is needed there for instructional aids. Flat pictures, charts, posters, maps, globes, filmstrips, slides, records or tape recordings are most valuable when they remain in the classroom as permanent equipment. These materials will be supplemented by other teaching aids from the building or system-wide materials center. Classroom planning should include space for map cases, large file cabinets, filmstrip cabinets and storage for special equipment.

Teachers like to inspect instructional aids right at the materials center. If items are stacked in closets or piled on crowded shelves, they will not appeal to them. A trained librarian should be em-

ployed to classify, catalog and arrange displays of materials.

Before new purchases are stored away, their vital statistics should be recorded on department inventory records. This information includes date of receipt and purchase order number and makes it easy to replace or duplicate items. Materials are coded and labeled before being stored and circulated.

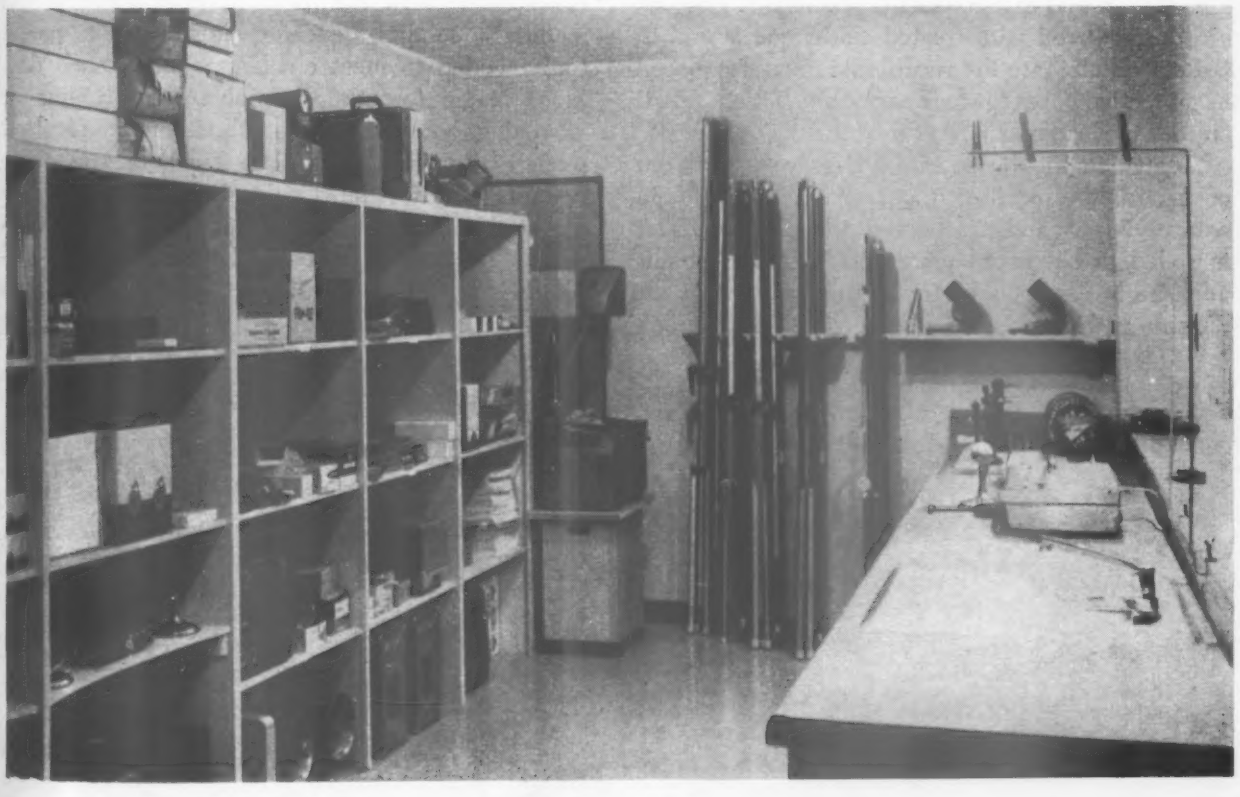
In planning a central storage area, several considerations are involved. Freedom from dust and moisture, thermostatically controlled temperature and regulation of humidity are essential. Storage units should be portable and sectional, for expansion and rearrangement. At our center filmstrips are stored in cabinets located near a preview room where teachers can examine them with viewers or projectors. Filmstrips are in individual plastic cans, labeled as listed in the card catalog. For protection during circulation the cans are packed in sturdy cardboard boxes.

Whenever possible, slides are arranged in magazines and issued for use with an automatic changer. A shipping case for the changer and up to six magazines protects the slides during distribution. Films are stored in metal cans located in wire racks of appropriate sizes and have fiber shipping cases.

Display materials, with their variety of sizes and shapes, offer many storage problems. Dioramas, globes and other large objects are placed in wooden cases in bins of proper sizes, constructed by the school carpenters. The carpenters have also made carrying cases of plywood for other objects, models and specimens. Cases are made to measure and lined with sponge rubber to prevent breakage. Large metal map cases store charts and pictures without folding or bending. Jumbo file cabinets accommodate picture sets, located alphabetically by titles. Fiber tubes with screw-cap ends are ideal for over-size materials that must be rolled. Large

School carpenters have also constructed special plywood carrying cases for odd-sized objects like this plastic model.

Storage is also needed for the equipment used with the instructional materials. Projectors, screens, recorders, etc., all require a suitable storage place.



Wong & Wong Photos

Education Center of the Tucson Public Schools houses the Instructional Materials Department and serves as the central clearing house for all such materials. Building was designed by architect Joseph T. Joesler.

pictures are backed with dry mounting cloth. This makes them durable, they can be rolled, and storage is simplified.

Records and transcriptions stand upright in pigeon-hole shelves two inches wide and eight, ten, twelve and sixteen inches in height. Records are dust-proofed with treated cloths and stored in jackets or albums. Pre-recorded tapes are placed in protective boxes to stand vertically. Titles appear on the tape leader as well as the box.

Storage implies that proper care will be taken of materials, especially those that are fragile in nature. Pupils and teachers quickly lose interest in soiled or shopworn materials. Working models must be in correct adjustment to accomplish their purpose and should be carefully checked after each use. New instructional materials deserve the best housing we can provide for them.

It has been said that the American teacher is the only professional person still working today with yesterday's tools. Every teacher and pupil deserve to have the best possible instructional materials. Modern teaching aids are the power tools needed to meet challenges faced each day.

No magic formula will solve the problem of supplying new instructional materials for our schools. But remember that teachers use these materials and for the benefit of the students. Keep these persons in mind as materials are contemplated, purchased, stored and distributed. A successful demand, supply and use system will then result.

ARGUS CAMERAS, INC.

Subsidiary of Sylvania Electric Products, Inc.

Ann Arbor, Michigan

Here's a new idea from Argus that makes it really easy to get started in Educational TV. The Argus Starter System. It's a complete system, camera with a 1-inch f:1.9 lens, tripod and dolly —receiver and monitor—transformer, distribution box . . . even coaxial cable —everything you need to get started right away in teaching with TV.

now less than $1260* buys you a complete closed-circuit TV system!

The Starter System is the sane, economical way to find out how TV can help you with your own teaching problems. If you now have TV receivers, they can be part of your Argus System, reducing this low price still further.

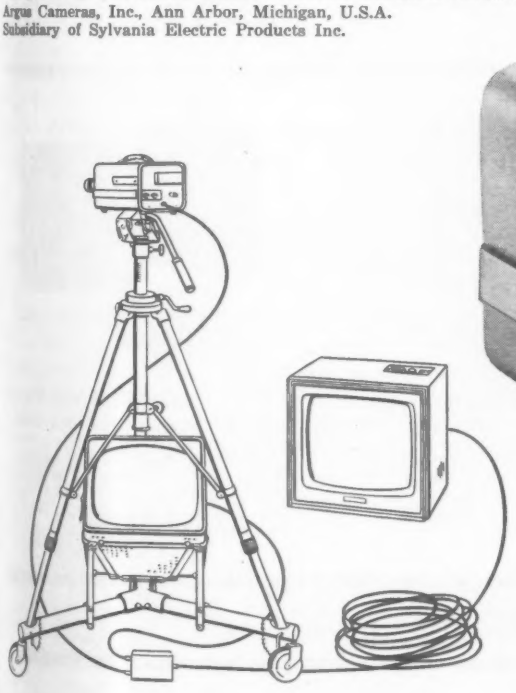
When your TV needs grow, your starter system needn't be replaced. It can be expanded into a school-wide Argus system of standard, low-cost components, including an integrated sound system.

There's an Argus AV dealer near you who handles the new Argus Starter System and will be glad to help you get the most out of it.

Write to Argus Audio-Visual Systems, Dept. 431, Argus Cameras, Inc., Ann Arbor, Michigan, for a copy of "Using Television in Teaching" by James L. Page, Assistant Director of the Audio-Visual Center of Michigan State University.

***Eligible for purchase under National Defense Education Act.**

Argus Cameras, Inc., Ann Arbor, Michigan, U.S.A.
Subsidiary of Sylvania Electric Products Inc.



argus

GENERAL TELEPHONE & ELECTRONICS

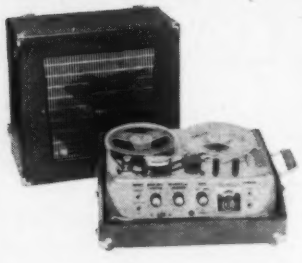
RHEEM CALIFONE CORPORATION

Dept. ASU-61, 5922 Bowcroft Ave., Los Angeles 16, California

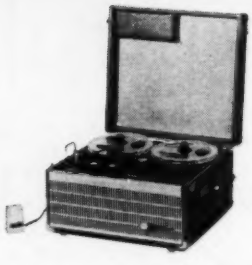
Manufacturers of Portable Phonographs, Transcription Players & Complete Sound Systems

SOUND LEARNING THROUGH LIVING SOUND

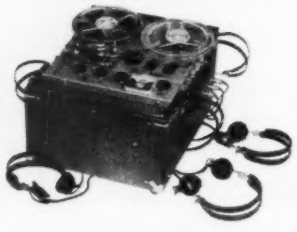
The exacting requirements of schools and universities for superior sound recording and high fidelity reproduction are brilliantly served by Califone audio equipment. Educators appreciate the rugged construction and lightweight portability, along with such exclusive Califone conveniences as precise, immediate return to any desired portion of a tape or disc recording. Other features are "perfect pitch" variable speed motors, kick-proof speaker grills, ample performance for the varying needs of classroom, library, auditorium and playing field. And the Califone quality line is realistically priced to fit any budget.



LEXICON TAPE RECORDER (71-T)
16-watt peak-to-peak, push-pull amplifier. Continuous duty synchronous motor. Takes up to 7" reels at 3¾ or 7½ IPS. Detachable 12" speaker for powerful P.A. system. Safety button protection against tape erasure, spilling or tearing. School net: **$279.50**

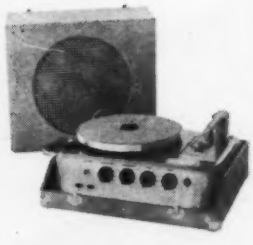


COMET TAPE RECORDER (70-T)
Excellent Fidelity at minimum cost. Records up to 7" reels at 3¾ or 7½ IPS. Fool-proof, 2-speed heavy duty tapedeck. Chrome kick-proof speaker grill. Case closes with 7" reels in position. Microphone included. School Net: **$199.50**



MASTER TAPE RECORDER (75-TA)
Makes superior master tapes. Permits listening through headphones for up to 10 students, through speaker to audience of 500 persons. Also excellent as P.A. system. School Net: **$349.50**

LISTENING CORNER (12VJ8-9)
All-purpose transcription player with 8 headphone outlets for comfortable group listening. Extended range concert speaker disconnects when headphones in use. Variable speed turntable. School Net: **$152.00**



DIRECTOR (12V-9)
Transcription player/P.A. system. STROBESELECTOR variable speed motor for rhythm work. 12" extended range concert speaker. Spring float suspension insures against groove jumping. School Net: **$146.50**

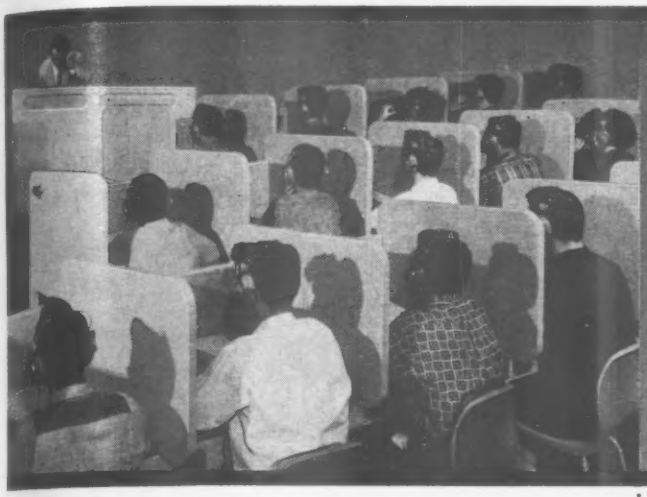
PREMIERE II (5J-7C)
Handsome new portable classroom phonograph. Clean, wide-range tone. Designed for trouble-free use by younger pupils. Tone arm automatically locks in place, is easily released. Handy cord-storage compartment. Pilot light. School Net: **$69.95** + Ex. Tax.

NEW YORKER (4J-8)
A classroom phonograph offering Califone quality at a new low in cost. 4-speed turntable. 7" extended range speaker. Safety needle guard. Metal reinforced carrying case. School Net: **$54.95** + Ex. Tax.

PROMENADE II (42V)
Complete portable sound system. Dual cone extended range speakers. STROBESELECTOR variable speed motor requires no warm-up. Boosted bass. New jet-silver and chrome color combination. School Net: **$209.50**

All prices quoted are School Net Costs, subject only to quantity discounts. For catalog on Califone classroom tape recorders, transcription players, phonographs and complete sound systems, consult your Califone dealer or WRITE TODAY.

RHEEM CALIFONE CORPORATION

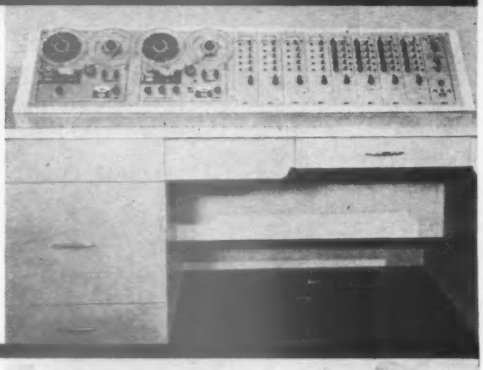


SOUND LEARNING THROUGH LIVING SOUND

Today's young Americans are learning to talk, think and LIVE a foreign language with a speed and ease inconceivable just a few years ago—thanks to the advance of modern electronic Language Laboratory techniques.

The new Rheem Califone line of Language Lab components (reflecting 20 years' leadership in school and professional audio equipment) comprise the most reliable, versatile and scientifically engineered instruction centers available today. Compact and rugged, tamper-proof and easy to operate, they are adaptable to any learning requirement.

Rheem Califone is the only manufacturer of Language Laboratories which designs and produces ALL of its components (including RC magnetic tape) specifically for the educational field. Rheem Califone equipment is engineered to operate without failure and to withstand the hardest use.



Design and functions of the Console assure the teacher's convenience, comfort and positive fingertip control over each classroom situation.

Complete booth installation with versatile, easily operated DUPLEX recorder. Student may work with class, or independently with master tapes.

ALSO AVAILABLE are booth installations with SIMPLEX high fidelity student recorder—simple to operate and tamper-proof (the tape is never seen nor touched!) and the VOCALE (Audio-Active) system which provides for complete intercommunication and "listen/hear-back" instruction.

Teacher and student *Switch Panels* are of efficient, simplified design, permitting maximum function with minimum number of switches.

Language Laboratories, permanent or portable, may use any combination or modification of these basic booth types. To determine YOUR exact layout and function requirements, consult your local Rheem Califone dealer. Or WRITE TODAY for catalog.

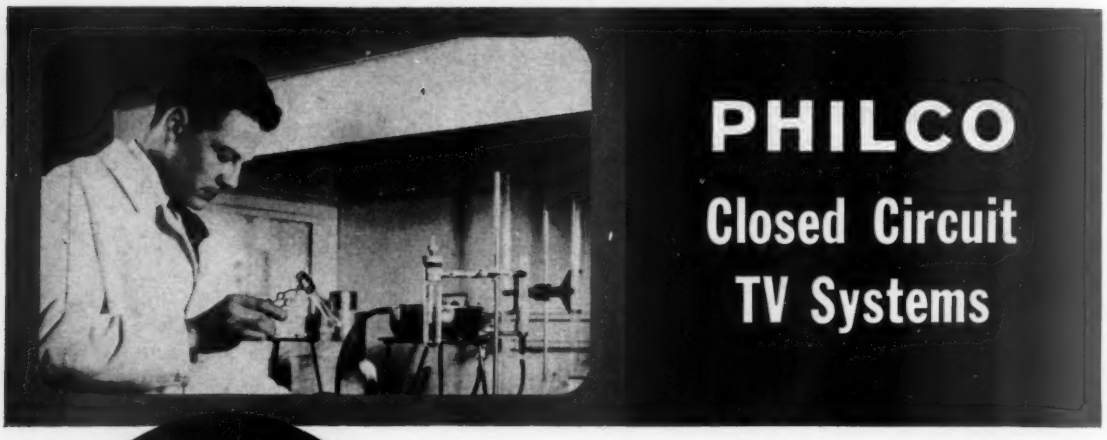
Rheem califone CORPORATION / 5922 BOWCROFT AVE., LOS ANGELES 16, CALIF. DEPT. ASU-61

FOREMOST MANUFACTURER OF SELECTIVE AUDIO-VISUAL PRODUCTS FOR EDUCATION

PHILCO

Government & Industrial Group

4700 Wissahickon Ave., Philadelphia 44, Pa.



INCREASE SCOPE AND EFFECTIVENESS OF INSTRUCTION

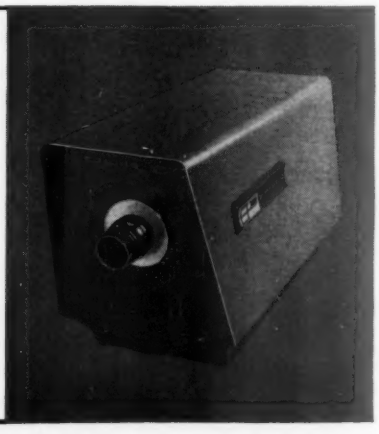
The high value of closed circuit TV in education has, of course, been recognized for some time . . . meanings are clearer . . . impressions are deeper . . . attention is greater. Instructional TV also allows the great economy of multi-group instruction, and makes specialized teaching talent available to more students.

Philco's broad experience in instructional TV is your assurance of system flexibility, economy and adaptability. Fully transistorized equipment featuring Philco's "building-block" design assures ease of operation, freedom from maintenance problems and the satisfying of expanding TV needs without costly replacement. Philco engineers will be glad to assist you in planning your closed circuit TV system. Write today stating your problems.

PHILCO ALL-TRANSISTOR CLOSED CIRCUIT TELEVISION CAMERA

FEATURES

• Low cost • Economical—to install, operate and maintain • All transistor reliability • Simplified remote control operation • No interference with other electronic equipment • Flexible—operates on 117 volts AC or 12.5 volts DC • Easy to operate • Automatic light compensation • Requires no special ventilation



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The True Value of Any "Teaching Machine" Is Based Upon the Programmed Material That Goes Into It

"Machines do not teach. Programming is the key to this new and rapidly developing medium of instruction. No so-called 'teaching machine' is any better than the program that is prepared for it. The danger is that technology – the over-emphasis on 'hardware' will mask program inadequacies and encourage superficial programming procedures. In fact, present testing of these materials has been accomplished with simple, easy-to-use, inexpensive binders which take the place of a machine. Unless course content is handled by the very best subject-matter specialists, working with experienced experimental psychologists, the final result is likely to be inadequate.

"EBF believes that there are certain ingredients that are essential to the preparation of effective programs. The materials must be prepared on the basis of sound psychological procedures. They must be thoroughly tested under classroom conditions and the results measured against recognizable and widely-used criteria. The testing must provide feedback that is incorporated into the final version of each program, and further provision must be made for continual revision and improvement based on this feedback.

"We have established a center for continuing research into learning and motivation and the production and testing of programmed instructional materials. Now we begin to report to you on developments at that center. We hope you will find this report, and the others that will follow, helpful in shaping your plans for programmed instruction."

Maurice B. Mitchell, President
Encyclopaedia Britannica Films

Encyclopaedia Britannica Films, in co-operation with the Britannica Center for Studies in Learning and Motivation is engaged in a series of large-scale research projects to investigate the potential of programmed learning for use in elementary and high school systems in the United States and Canada. We feel we should now report on this activity to school administrators and educators generally, all of whom are aware of the current activity in this rapidly developing field. *(We will not therefore go into programming and other techniques that are involved. If you would like details on this specific area of activity, we invite your inquiry.)*

We are currently testing eight semesters of programmed material in the area of high school mathematics. These tests involving almost 5,000 students in school systems in five separate geographical areas are intended to provide answers to various questions about programmed learning. Every effort is being made in these tests to use research, control, and systems that will provide useful and significant information. In essence, this information will be as applicable to any field of study as it is to the study of mathematics.

These experimental studies are, in each case, under direct supervision of an experimental psychologist who is either a research professor in a nearby university or, in one case, a leading research psychologist for a large aircraft company.

The specialists, working in conjunction with the local school administrators, are now engaged in assessing the manner in which programmed material can most effectively be utilized in connection with the high school curriculum.

One very important aspect of programmed learning is that the material is broken down into small steps which are organized in a systematic fashion to give the student an understanding of the basic structure of the subject matter. This breakdown, which is done by an expert in the field, enables the student to understand the material that he is dealing with, rather than simply to memorize it.

A second extremely important feature of programmed learning is the fact that the student receives immediate knowledge of results . . . *reinforcement.* At every step of the learning process the student is asked a question concerning the material that he has just assimilated. This makes the student an active participant in the learning process and, through immediate knowledge of results, gives him the kind of reinforcement that plays an integral part in the learning situation.

The third important characteristic of programmed learning is that each individual is allowed to go at his own pace. This means that the bright student can move very rapidly, and the student with less ability can take the time necessary to adequately comprehend the material. By ending the typical lockstep process of the traditional classroom situation, the teacher is free to give the kind of individualized instructions that are so important in the teacher-student relationship.

A series of reports is being regularly released . . .

The first report on programmed learning materials is now ready. If you did not receive it within the past few weeks, write us and we'll be pleased to send it to you—Ask for **TEMAC** – Programmed Learning Materials—Report No. 1.

Report No. 1 gives specific answers to many of the questions that you as well as other educators and parents are asking: "Just what is a 'Teaching Machine'?" . . . "What part does the teacher play when programmed instruction is used?" . . . What can we expect in the way of speed and performance on programmed material?" . . . "How will I like programmed material as compared to conventional teaching?" . . . "How much will this programmed material cost?"

The following courses are now being prepared, and some will be ready for the 1961 school year:

First-Year High School Algebra
Plane Geometry
Second-Year High School Algebra
Trigonometry—Solid Geometry

Introductory College Mathematics:

Unit I—The Language of Algebra: Fields and Ordered Fields
Unit II—College Trigonometry *(Feb. 1, 1962)*
Unit III—Analytical Geometry *(Feb. 1, 1962)*
Introductory Calculus I
Introductory Calculus II
Intermediate Calculus
Differential Equations

Three-Year High School Language Courses:

French—Programmed in Units A, B, C
Spanish—Programmed in Units A, B, C
German—Programmed in Units A, B, C

The program for the language course has support from a Carnegie Corporation grant to Hollins College.

TEMAC is the name given the results of the work we are doing in the field of programmed learning. We believe **TEMAC** will become the standard for all other developments in this important area.

If you are not now on our list to receive additional information, be sure to write:

Raymond P. Kroggel, Vice President,

TEMAC

PROGRAMMED LEARNING MATERIALS

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In Canada: Encyclopaedia Britannica Films (Canada) Ltd., 67 Kipling Avenue, So., Toronto, Ontario

METAL WORKS, INC.

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STUDENT BOOTH

MWI

NEW all metal booth.

Maximum sound proofing and isolation between students.

Booths can be secured individually, or grouped for large installations.

Sturdy and easily assembled by simply bolting one unit to the next.

Slope top lowered becomes a desk top with 3° slope.

MASTER CONTROL CONSOLES and TURRETS

Booths and Consoles in matching colors.

Controls for 60 unit classrooms.

Other size units available.

Additional phono drawers or tape storage drawers can be provided.

Height 29", depth 30", width from 26" to 70".

Turrets in triple, double, or single units. 17½" panel space on slope and 3½" front.

RHEEM CALIFONE CORPORATION

Dept. ASU-61, 5922 Bowcroft Ave., Los Angeles 16, California

Pupils at Calabash Street Elementary School (Woodland Hills, California) participate in a field test of Porter's Spelling Program, utilizing the Didak 501. According to principal Dr. Edmund B. Adams: "...on the basis of our experience ... it may be concluded that the Didak 501 is suitable for use by elementary school upper grade pupils."

School Net: $157.50

RHEEM CALIFONE presents

An Important Advance in Automated Teaching

DIDAK 501

Here is a remarkably simple and versatile teaching tool which permits the student to participate actively in the learning process, and which frees the teacher from the ordinary rote learning class drills. As an outstanding Research Instrument, the Didak 501 measures the effectiveness of programmed material by keeping an accurate record of student response.

The DIDAK 501 is sturdy and simple to operate, requires no electricity and permits easy, low-cost program preparation by the researcher with standard (8½" width) paper stock.

The DIDAK 501 assures individual high-level mastery by ALL students, each of whom proceeds at his own rate – motivated by continuing knowledge of his progress.

For full particulars on the DIDAK 501, consult your Rheem Califone dealer, or WRITE TODAY.

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FOREMOST MANUFACTURER OF SELECTIVE AUDIO-VISUAL PRODUCTS FOR EDUCATION

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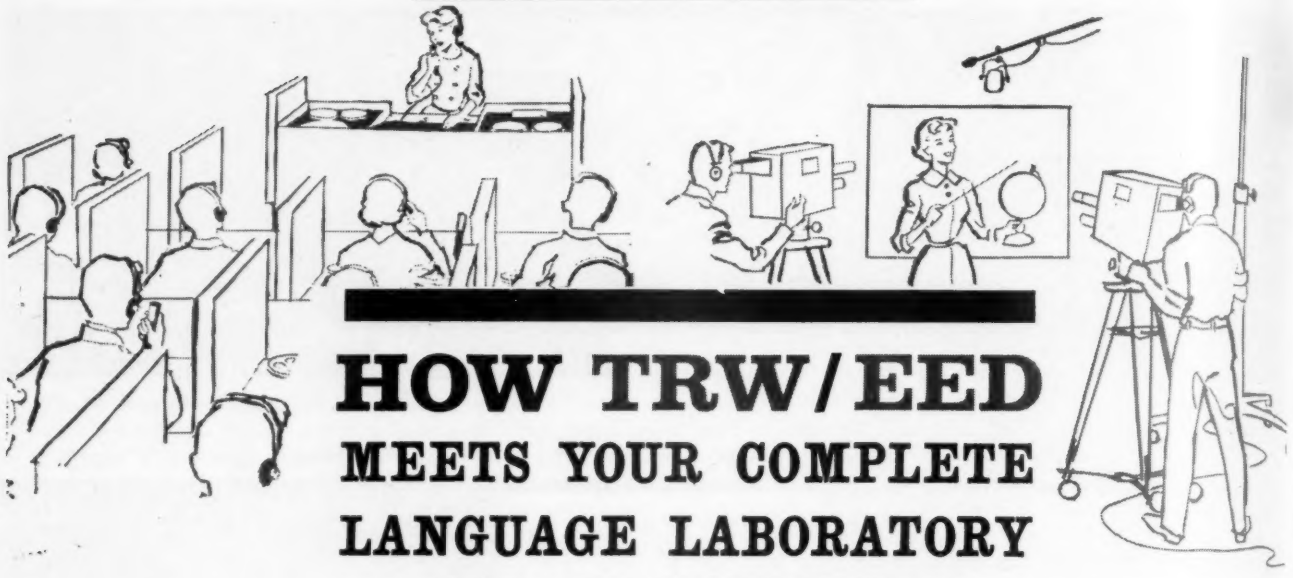
EDUCATIONAL ELECTRONICS DIVISION

532 Sylvan Ave., Englewood Cliffs, New Jersey



HOW TRW/EED MEETS YOUR COMPLETE LANGUAGE LABORATORY AND EDUCATIONAL TELEVISION NEEDS

a *total* concept, unmatched in Quality equipment, experience-proven in more than 2000 installations / Guidance materials to help teachers and administrators use this equipment most effectively

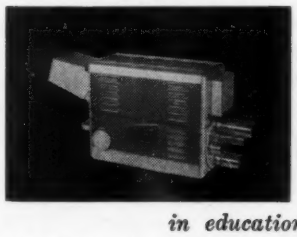
■ Administrators and staffs gain important advantages from the pooled background of MRI and DAGE—now combined as TRW/EED, Specialists in electronics for education. ■ Planning is simplified by choosing from the *world's most complete line of language laboratory and educational TV equipment.* There is a TRW/EED system to match your exact needs, regardless of size and budget. Modular design keeps expansion costs at a minimum. ■ A major benefit for teachers is the continuing program of TRW/EED educational services and materials, designed to make teaching most effective and gain maximum utilization of equipment. Consisting of seminars, local consultation, publications and newly developed techniques, they are an integral part of the TRW/EED concept. ■ These services can help you plan for—and make the best use of electronics in education . . . in Language Laboratories and Educational Television. ■ Write for complete details today. ■ *Educational Television and Language Specialists available in your area for consultation.*

Advanced equipment that typifies MRI & DAGE leadership:

in language laboratories

NEW Model 80 MAGAZINE DUAL-LANGUAGE RECORDER-PLAYER—Simplest recorder-player to use . . . developed exclusively for language laboratories.

NEW TRW Model AV-100 PORTABLE RECORDER/PLAYER—Light, rugged, with professional features to meet educational needs.



in educational television

Model 320- B/V Broadcast Camera for use with any of 3 Dage Professional TV Systems . . . top performance, minimum maintenance, compact, low cost.

SYSTEM ETS-1: Broadcast quality TV for the classroom. Compact, flexible, easy to use and maintain.

EDUCATIONAL ELECTRONICS DIVISION

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KALART VICTOR

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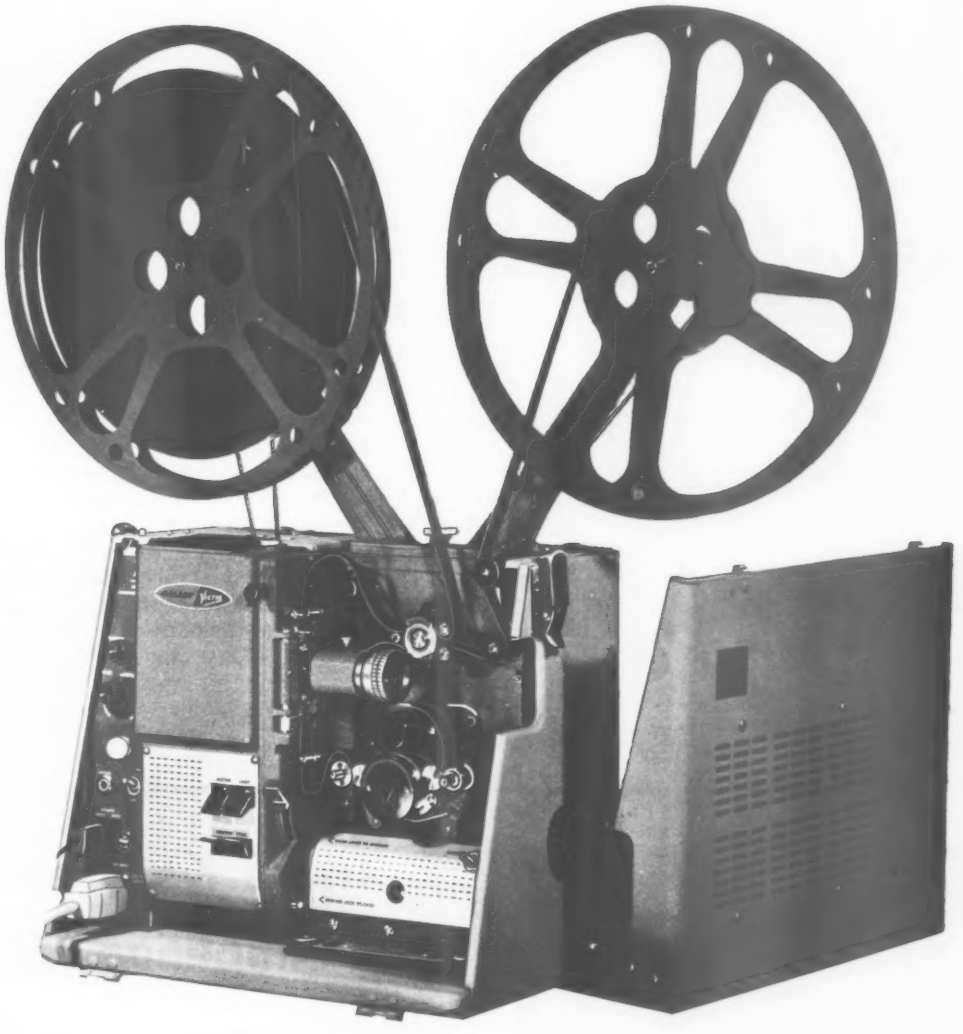
16mm SOUND PROJECTORS



NEW SERIES 70 IMPROVES 16mm PROGRAMS THESE 5 WAYS

1. DISTRACTING NOISES ELIMINATED

Reduction of motor, air and gear noises make this the quietest running 16mm sound projector ever built. It *never* distracts audience attention.

2. FORGET OILING 364 DAYS A YEAR

Improved mechanical efficiency makes oiling necessary only once a year. Reservoir holds enough oil to last for 1000 hours — or a full year's heavy use.

3. MORE LIGHT—EVEN FOR STILLS

Newly designed shutter alone provides 12% increase in light output. Further boosted by new shuttle framing. Stills are 5 times brighter, to permit focusing attention on a single frame.

4. MAGNIFICENT SOUND QUALITY

New, more powerful amplifier is built to specifications of finest high-fidelity equipment. Sound actually comes to life.

5. GREATER FLEXIBILITY IN SPEAKER PLACEMENT

In-the-door speaker mounting permits showing a film without detaching speaker from projector if desired. Yet speaker door is easily removed, and may be placed up to 50′ from projector.

TWO NEW

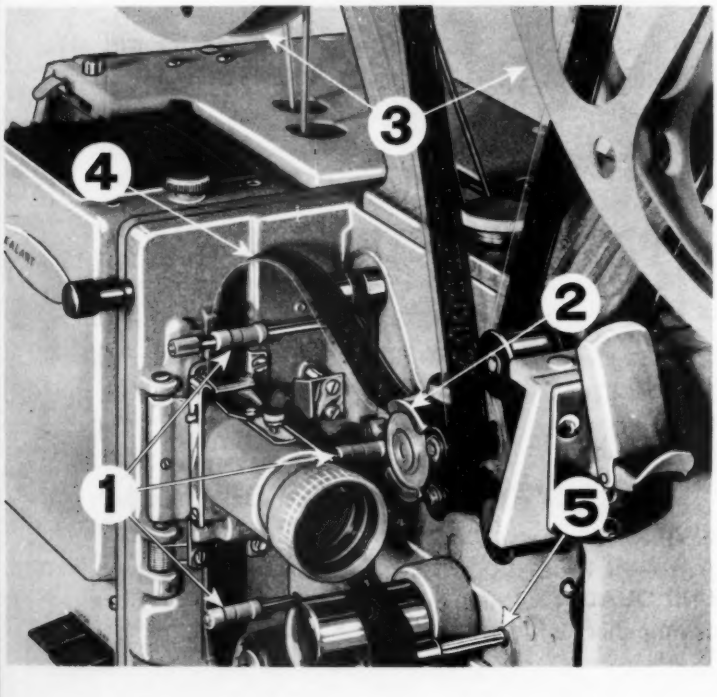
KALART VICTOR

SERIES SEVENTY

16mm Sound Projectors

MODEL 70-15

Its sound system featuring 15-watt amplifier and increased light output make it ideal for rooms of all sizes up to medium sized auditoriums. Complete in a single aluminum case. Liftop contains reel arms and power cord. Door-mounted 8″ speaker comes with a 50′ cord. Equipped with 2″ f:1.6 coated lens. Amplifier incorporates circuit for separate tuning of treble and bass. Has input for microphone or record player; volume, bass and treble controls; and is outlet-matched for single or dual speakers. A separately cased 12″ speaker can also be used. With tone controls set at normal, amplifier frequency response curve is flat from 100 to 18,000 cycles per second to reproduce every signal that a film can carry. Total weight is 40 lbs.; dimensions are 9½″ x 15″ x 11″.



These Key Features Assu ole- Simplified Operation, ecti

❶ **Safety Film Trips.** Film costs money, and nothing offers greater protection against film damage than Victor's Safety Film Trips. Three trips, one at each loop, stop the projector instantly and automatically in film emergencies. One of the greatest advantages of Safety Film Trips is the confidence they give to beginner projectionists who know that costly film is always protected against damage. Kalart/Victor is the *only* projector with this feature.

❷ **Single Drive Sprocket.** Kalart/Victor projectors incorporate a large single drive sprocket instead of a multiple sprocket system. With the single drive sprocket, film always enters and leaves the projector at the same speed. Thus undue stress or shock to film is eliminated, and tension on film is kept uniform.

❸ **Top-Mounted Reels.** Both reels of the Kalart/Victor are mounted on top of the projector — out of the

MODEL 70-25

A powerful amplifier conservatively rated at 25 watts makes Model 70-25 the projector-of-choice when showing films in large rooms and auditoriums. The amplifier has inputs for two speakers, as well as for phonograph and microphone. Bass, treble and volume controls are provided; with a separate volume control for microphone. The projector is shown here with separately cased 12″ speaker, but is also available with door-mounted 8″ speaker, or both. With the exception of amplifier, and lens (Model 70-25 features a quality 2″ flat-field f:1.6 lens), specifications for this model are identical to those for Model 70-15.

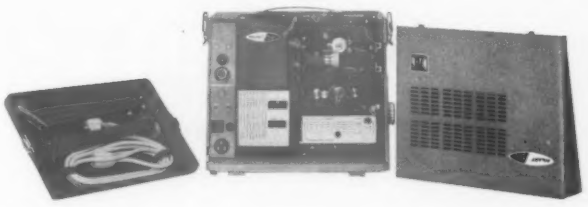
ble–Free Performance, ection of Costly Film

way–for setup on any level surface. This feature eliminates the danger of knocking the projector off its stand by brushing against an overhanging reel. It also makes for easier threading and rewinding.

Offset Loop. This is a basic Kalart/Victor design feature. Without it, the above three advantages could not be built into the projector. In addition, the offset loop helps eliminate picture weave because the loop exerts natural side tension on the film at the film gate. Side tension at the tension clips is reduced to save wear and tear at film edges.

Color-Coded Threading Path. Threading a Kalart/Victor is simple. There are only three spots to thread, and the threading path itself is color coded to show location and sequence. Follow the path in red-white-and-blue order, and the projector is ready to run.

SPECIFICATIONS



General. The same projector mechanism is used in both Series Seventy models. Amplifiers and speakers vary with models to meet audience requirements. Standard equipment includes 750-watt T12 projection lamp (1000-watt and 1200-watt lamps are optional), 1600′ reel, oiling kit and spare fuse. Choice of Mark II (2 interruption) or Mark III (3 interruption) shutter. Power requirements are 105-130 volts, 50-60 cycle AC.

Operation. All controls are centrally located. Projector controls include sound and silent speeds, still picture, reverse and power rewind without changing belts or reels. Large Instantilt knob on front of projector. Lens swings out 180° for easy cleaning and for threading. Both reels are mounted on top of projector for setup on any level surface without overhang. Accepts 2000′ reels. Threading path is color coded to show easy red-white-and-blue threading sequence. Lubrication required only once a year, or after each 1000 hours of use.

Sound System. Amplifiers are audio-engineered to provide full rated power with minimum distortion. Heavy duty exciter lamp helps prevent distortion caused by old film. Sound lens depth of focus assures highest quality reproduction. Sound drum is stationary, has no moving parts to get out of adjustment. Every Victor projector is adaptable for recording and playback on magnetic striped film with accessory Victor Magnesound.

Light Output and Optics. Equipped with Mark II shutter, and 1000-watt lamp, projector puts approximately 500 lumens of light on screen. Built-in heat filters permit use of 1200-watt lamp for even greater light output and provide for a truly outstanding still picture. Special mounting holes accommodate snap-in bracket for the new Victorscope anamorphic lens for wide screen projection.

Film Safety. Safety Film Trips stop projector automatically in emergencies before film can be damaged. Overheating prevented by large fan and heat-absorbing filters. Safety rewind lock release prevents accidental rewinding. Large single drive sprocket assures uniform tension on film at all times. Sapphire-tipped duo-flexo pawls are self-aligning, prevent torn sprocket holes. Compensating film shoes automatically adjust to varying film thickness.

Guarantee. All Kalart/Victor projectors are guaranteed against defective materials for life, and for workmanship for one year (lamps and amplifier tubes not included). Projectors carry approval by Underwriters Laboratories and Canadian Standards Association.

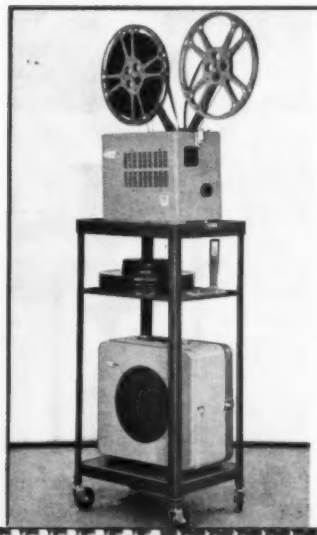
ACCESSORIES ADD TO USEFULNESS TO KALART/VICTOR PROJECTORS

VICTORSCOPE - For Projecting Cinemascope Productions

Permits showing wide-screen programs with the Kalart/Victor projector. Specially designed bracket fits Kalart/Victor projectors which incorporate necessary mounting holes. Lens can be plugged in and removed instantly. Lens may also be used as a "taking" lens with most 16mm cameras and special adapter.

MAGNESOUND - For Magnetic Recording and Playback

This recording and playback attachment for all Victor 16mm sound projectors enables the user to record and play back a sound track on any magnetically striped, single or double perforated 16mm film. Used for recording on existing silent film or optical sound film. Separate inputs and volume control for microphone and phonograph permit mixing voice with musical background. Records and erases in a single operation. Quickly attached to projector by replacing optical sound drum and exciter lamp with magnetic sound drum. Complete with sound drum and amplifier in carrying case. Microphone is optional.



VICTOR MOBILE PROJECTOR STAND

All metal welded construction with four large swivel caster wheels. Exclusive floor lock wheels prevent "creeping" while projector is in use. Easily shifted to roll position by touch of toe. Will hold projector, separate speaker and many accessories. An essential piece of equipment where one projector must service many rooms.

PADDED SLIP COVERS

Protect projectors and speakers from dust, weather and scuffing. Made of strong Duraleather fabric that will not crack or grow stiff with age. Reinforced handle opening. Washable. Sizes to fit all Kalart/Victor Series 70 Models and projectors, as well as older Victor models.

KALART VICTOR

world's most experienced manufacturer of 16mm projectors

VICTOR ANIMATOGRAPH CORPORATION Est. 1910
A Division of Kalart
PLAINVILLE, CONNECTICUT

2518C-02-613

Printed in U.S.A.

NO MATTER WHAT THE SUBJECT, RCA ELECTRONICS HELPS YOU TEACH IT BETTER!

From Algebra to Zoology, from Science to Social Studies, RCA electronics provides the tools for superb visuals, magnificent sound and new techniques that quicken the student's interest, help him learn faster and retain more.

RCA "LIFE TESTED"* 16MM PROJECTORS

Top Rated in all Five Key Projector Qualities

RCA "Life Tested"* 16 mm projectors lead the field in all five vital areas of projector performance—ease of operation, brilliance of picture, sound quality, care of film, low maintenance. Continued improvement in engineering and design make the 1961 E series the finest RCA projector ever. This model features easiest threading film path, single switch operation, self-lubricating parts, "softest touch" film pressure guides. Now also available with single switch reverse action that's quick and quiet, smooth and safe. RCA "Life Tested"* Porto-Arc Projector shows pictures of extra brilliance. Ideal for large areas.

RCA "SCHOLASTIC" RECORD PLAYERS

High Fidelity Sound at low, low Price

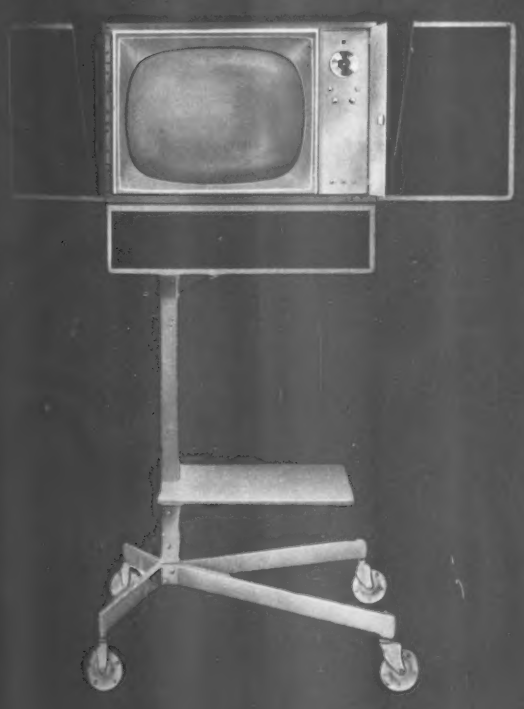
Good to listen to, easy to operate, this lightweight (12 lbs.) rugged performer was designed for a long life of hard use. Features metal re-inforced corners, re-inforced speaker grille, guarded tone arm, scuff resistant case. It plays at four speeds and contains easily replaceable ceramic cartridge with "flip-over" needle changer. The "45" spindle is permanently fastened.

RCA PORTABLE TAPE RECORDERS

Professional Type Equipment for "Across the Roster" Use

Language, dramatics, instrumental and vocal music, reading . . . these subjects and more benefit from the use of this professional type monaural tape recorder. The recorder operates at three speeds, has an excellent frequency response, 8 watts audio output and two built-in speakers. Other important features include an accurate footage counter and volume indicator. Control panel is cleanly functional and easy to operate. It's portable, too!

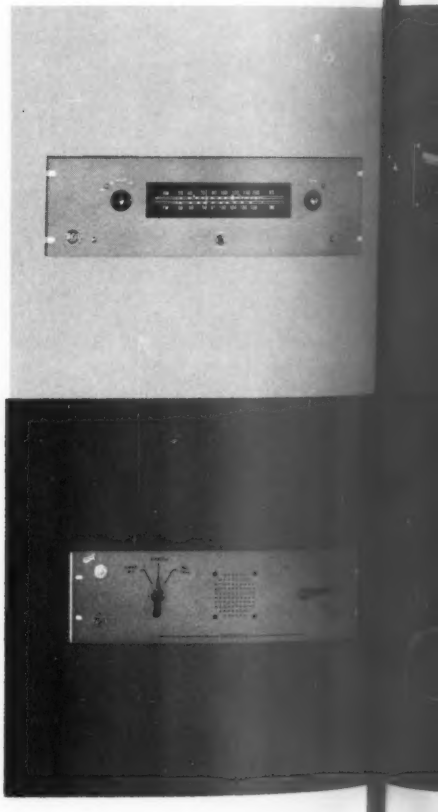
**Rigid endurance standards have been set for RCA "Life-Tested" Projectors. Individual components as well as finished projectors are subjected to continuous testing to evaluate the durability and efficiency of all operating parts. "Life-Tested" at RCA means better, more reliable performance from RCA Projectors.*



RCA LYCEUM EDUCATIONAL TV RECEIVERS

Especially Designed for Classroom Use

Here's a TV receiver that was made for the school! For use in either regular or closed circuit telecasts, the Lyceum features a 21 inch screen that can be tilted for improved viewing from all parts of the room, a fan-out light shield to reduce glare, and built-in safety precautions for fool proof operation. Mobile stand permits easy movement from room to room. Set locks when not in use.



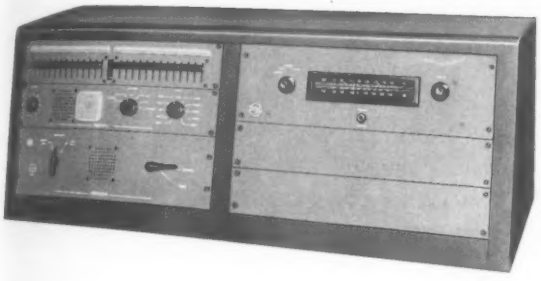
RCA MODULAR SOUND SYSTEMS

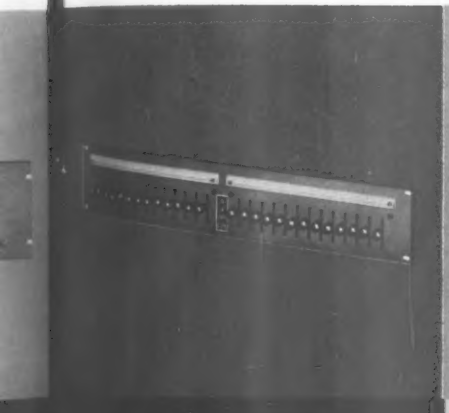
. . . engineered for economical, dependable in-school performance

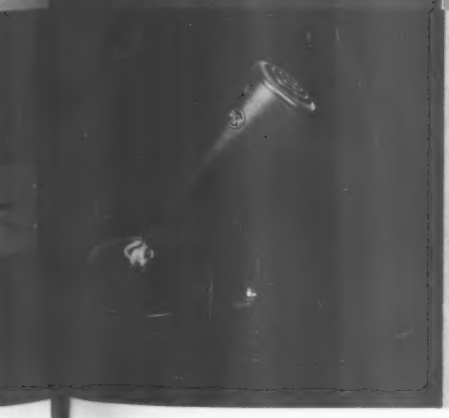
For more than three decades RCA Sound Systems have been serving schools throughout the country, giving top quality performances in day to day programming, ever ready for split second action in the event of emergency.

Today RCA Sound Systems are more versatile, more reliable than ever before. And less expensive, too, thanks to new modular sound construction. RCA's modular sound plan lets you choose the exact sound functions you require for your school. Use of standardized plug-in components allows custom assembly at budget prices.

Choose from the more than 500 inter-matched components in the RCA sound line: speakers, amplifiers, microphones—a wealth of proven-reliable sound equipment to serve as the basis for your new sound system or as quality replacements or additions to your present one.







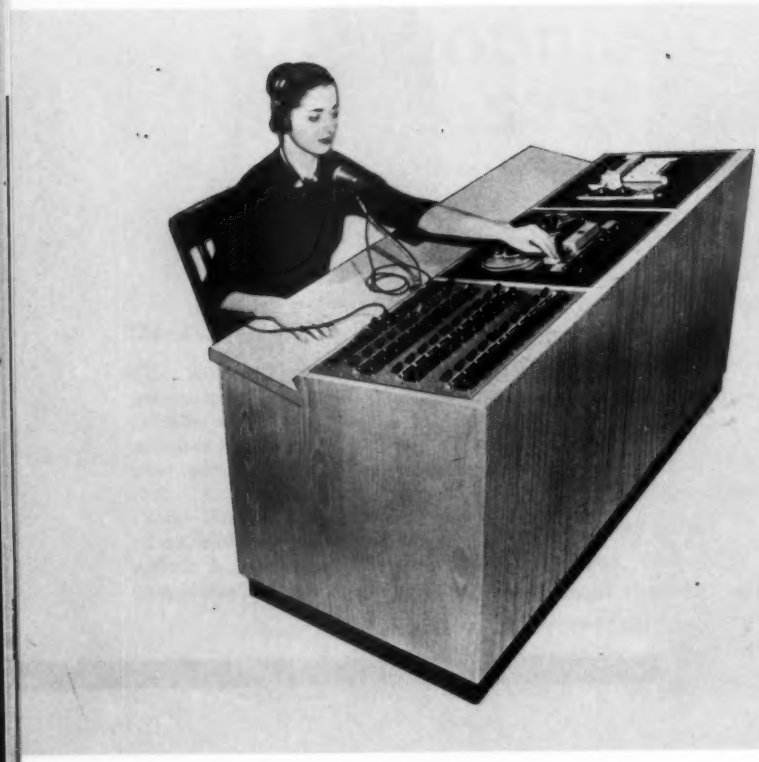
RCA 'LECTRONIC LECTERN

. . . ideal class gift for any school!

Inexpensive, portable (less than 25 pounds), RCA 'Lectronic Lectern incorporates a complete public address system that can be set up in seconds. Speaker's voice projects to the very last row of audiences up to 600. 'Lectern operates from any AC outlet, permits meetings and assemblies to be scheduled quickly anywhere. A perfect memorial gift for senior graduating classes to leave the school!

RCA PRECEPTOR

. . . THE SPOKEN LANGUAGE
EFFECTIVELY TAUGHT
THROUGH INDIVIDUAL INSTRUCTION

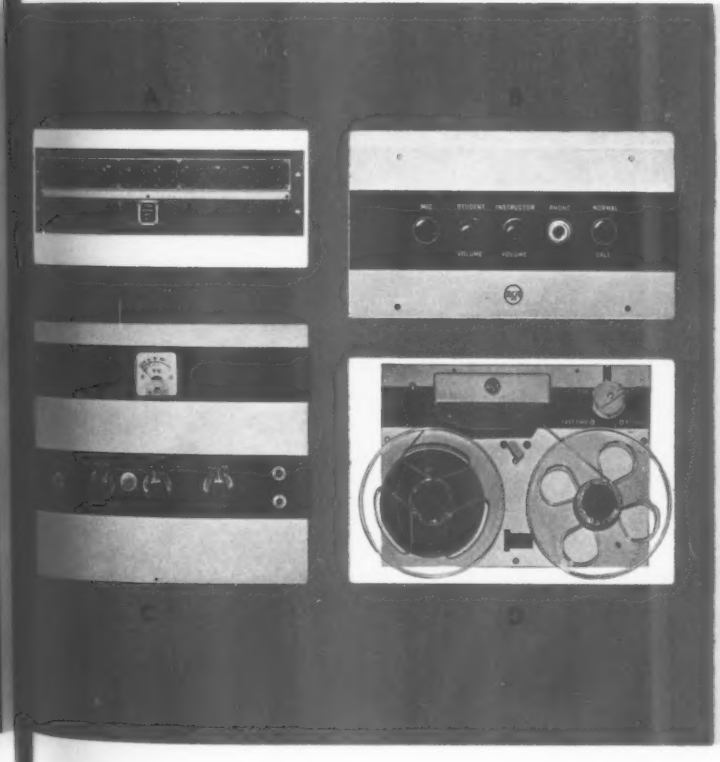


LANGUAGE LABORATORIES

Simplicity and flexibility are the key features of the RCA Preceptor System. Two switches for each student provide the teacher with functional control of the laboratory, enabling him to select and distribute the student's program, monitor and record the student's performance, and to communicate with the student. Up to ten programs can be played simultaneously; the teacher can transmit any of these to any student booth.

Ideal for small or large installations, the Preceptor System is capable of handling as many student positions as space will allow. The laboratory can be equipped entirely for Listen-Respond or Student-Record teaching, or for a combination of both techniques in the proportion you desire. Additions to the laboratory are easy and inexpensive. Simplified wiring and modular construction cut initial installation costs, permit expansion at any time.

Quality components, including the use of transistors at both console and booths, provide superior sound, dependable performance in class after class.

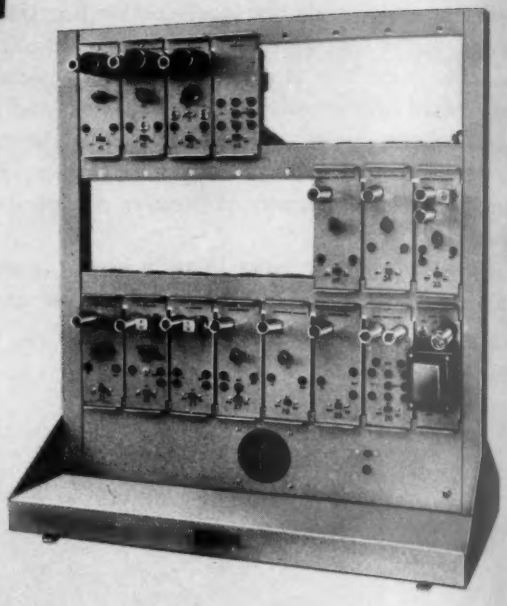


A Console Control Panel. Contains complete controls for 10 students. Additional panels can be added easily.

B Transistorized student amplifier. Requires no A.C. outlet in Booth. Plugs in for easiest installation.

C Student Record Amplifier— Simplified controls enhance rapid mastery of recording technique.

D Tape Deck. Single or dual track for use at Console or in student booths.



RCA ELECTRONIC TRAINERS

. . . compact "workshop" for electronics training

RCA Electronic Trainers lay a firm foundation for students' careers in the ever-growing field of electronics. New equipment utilizes building block technique, permits students to learn by doing and observation. Theory and practice unfold for students step-by-step and circuit by circuit. Instructor's console and student racks are designed to operate as a system. Plug-in components are used for fast, convenient connections. RCA Electronic Trainers incorporate the *latest* circuits, including transistors.

FROM RCA ELECTRONICS

. . . dynamic new tools for better education

Serving educators with the latest electronic teaching devices has been an important function of RCA for fifty years. In the preceding pages, you have seen much of the electronic equipment in RCA's newest, most advanced line for the schools of today and tomorrow. There is much more, of course, for school, home and industry . . . complete closed-circuit TV equipment for in-school use, tubes, amplifiers, speakers, microphones, intercoms, records, radios, test equipment and scientific instruments, to name but a few. Each bears the RCA trademark, a proud symbol of the most trusted name in electronics.

RCA

THE MOST TRUSTED NAME IN ELECTRONICS

RADIO CORPORATION OF AMERICA

MEADOW LANDS, PENNSYLVANIA

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F FURNITURE

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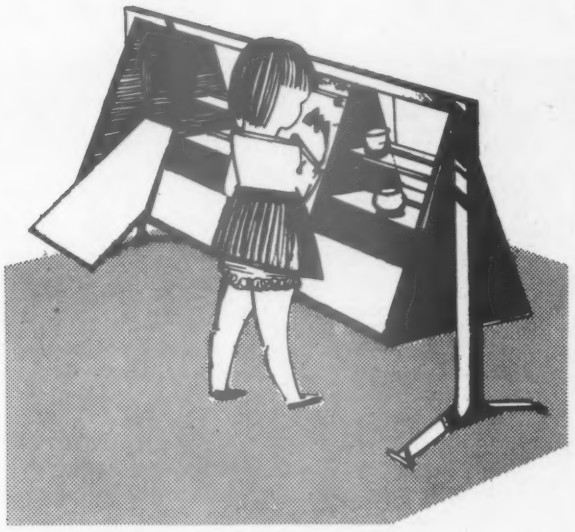
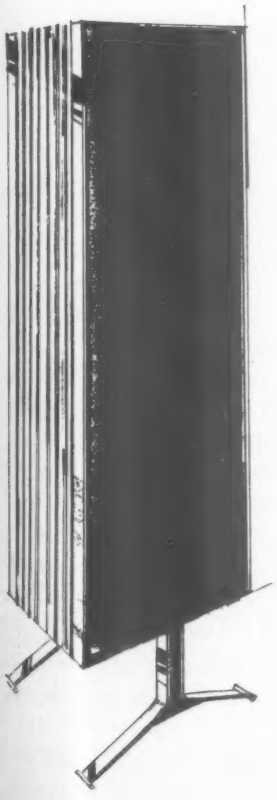


Purchasing School Furniture and Equipment:

a symposium



When a school district succeeds in purchasing the right kinds of quality furniture and equipment for its schools, there is no doubt that the educational program benefits. In the interest of helping and guiding school personnel to develop wise selection and buying techniques, AMERICAN SCHOOL AND UNIVERSITY has asked four representatives of leading school supply and equipment firms to contribute to a "purchasing symposium." These distributors have had long experience in the field, working with educators and manufacturers, and their efforts to serve education with integrity and high standards of performance are well known. Each has set forth what he feels are salient factors to consider in overall purchasing procedures, and each reiterates his dedication to the furtherance of excellence in education. AMERICAN SCHOOL AND UNIVERSITY is pleased to present this symposium.

Brunswick Corporation

Once items have been selected for purchase, their procurement should be insured against unsatisfactory substitutions.

Four Procurement Methods

by O. A. Eichenlaub

President, C. M. Eichenlaub Co., Pittsburgh, Philadelphia, and Harrisburg, Pa.

WE HAVE LEARNED, in making purchases for our businesses or for personal purposes, that we usually get what we pay for. We consider matters of useful life and upkeep, and purchase what we think will be least costly in the end.

School purchases, however, must be made in accordance with state and locally prescribed codes and regulations, with the possibility of censure by taxpayers always in the background. These factors cause some school purchasing groups to be unduly governed by the price tag, overshadowing other considerations. It hardly seems prudent for school buyers to place such great importance on "low bid." Quality, service, and reliability must be weighed against total cost, considered over the useful life of the product. Past experience with a given item, as well as price, should be a primary consideration.

It is fairly common practice in new school construction to leave furniture and equipment decisions to the general contractor who is concerned primarily with construction rather than education. In recent years this method of buying highly specialized educational facilities has created many misunderstandings about the selection of equipment and disappointments in the results.

Proponents of including equipment in the general contract reason that the general contractor should be responsible for complete coordination of the progress schedule. He can see to it that equipment suppliers deliver and install on a schedule that will comply with the contract completion date.

Some school districts prefer to purchase equipment under separate contracts, either with or without the guidance of the architect. When the architect participates, specifying and advising in regard to which items should be purchased, public disapproval of items purchased is not likely to occur. The architect, it is assumed, will make his recommendations based on past experience, and he is accepted as an expert.

After items have been selected for purchase, by one method or another, the problem is to insure their procurement without unsatisfactory substitu-

tions. Various means have been devised to assure that a school district will get just what it wants, and will pay only for what is received. In a recent trade association canvass of school equipment manufacturers and distributors throughout the United States, information was secured in regard to furniture procurement methods. From these reports a committee selected four methods which appear most practical, and which could be used anywhere in the country. Briefly, these are as follows:

Pre-qualification of bids. The architect, after specifying a certain manufacturer's item or "equal," requires that competitive items be submitted to him for consideration as equal prior to the due date for general contract bids. He then advises all general contract bidders which manufactured items have been ruled equal. The successful bidder is required to furnish either the item basically specified, or one approved as equal prior to the "bid due" date. This practice helps guarantee against deviations from the standard of quality required.

Allowances. In some instances fixed amounts are established for each type of equipment listed in the building specifications. General contractors include these fixed amounts in their proposals, but actual solicitation of proposals is carried out by school authorities through their architect.

Base bid with specific alternatives. Individual features of design, construction, finish and other factors may constitute critical differences between similar but competitive products in each category of school equipment. School authorities and their architect may wish to weigh each product against its cost and educational function. The general contractor includes only specific items in his base bid and quotes plus or minus amounts for specified alternatives.

Pre-filed sub bids. It may be advantageous, should time schedules permit, for the school architect and/or school authorities to accept direct proposals on equipment. The offerings are reviewed before the general contract is let, proposals are evaluated in terms of needs, and the lowest proposal meeting all requirements is selected. All general contractors are then advised to include in their bids the equipment proposal of the pre-selected equipment supplier.*

*A more comprehensive review of the four methods outlined may be procured by writing to the National School Supply and Equipment Association (NSSEA), 27 E. Monroe Street, Chicago 3, Ill.

S. H. Pomeroy Co.

Four procurement methods which have been found practical in selecting and purchasing equipment are pre-qualification of bids, allowances, base bid with specific alternatives, and pre-filed sub bids.

Classroom equipment constitutes the real tools of learning.

Educators Manufacturing Co.

Reserve for Equipment

by Robert C. Hill

Sales Manager, J. S. Latta and Son, Cedar Falls, Iowa

A QUESTION OFTEN discussed at local school board meetings is, "where do we get the money to equip our new school and how much will the equipment cost?" There is no stock answer to this question. Too many variables are involved. School planning, construction and equipping should always be considered from a long-range view and in entirety.

Purchases for a new school must be lived with for a long time. Once the building is completed, equipped and in operation it is here to stay. Some equipment will, of course, be replaced during the lifetime of a building, but careful and considered selection of the original equipment increases the life expectancy of both building and equipment.

Local boards of education have a great responsibility to the taxpayer and to the community, but an even greater responsibility to the children of the community. Wise investment of the tax dollar in education will pay greater dividends than any other investment a community can make.

Many hours and days are spent in selecting a competent and well qualified architect to design and build a new school building. The architect, in turn, skillfully transforms a combination of brick, mortar, steel, glass, etc., into a well designed and functional building to meet the requirements of the community.

But what of the classroom equipment that goes into this new building—the real tools of learning, the equipment that helps create a healthy environment for learning? Too often the important function of selecting equipment is left until the building is almost completed and then shortages appear, of time and money. Equipment is permanent and important factors are involved in selecting items which will create the best possible learning environment. Responsibility for the study and recommendation of equipment should be delegated to the educational authorities. Consequently, adequate time should be allotted by the educational staff for the study of equipment requirements *while the school building is being planned.*

The entire program could then be coordinated so that the costs of building and equipment will be determined before the building is started. A reserve fund can be set aside for equipment purchases. Many authorities state that this reserve fund should amount to from 8 to 12 percent of the total project cost, depending on whether the building is an elementary or high school structure. Other factors will also affect the reserve total.

Educational authorities should utilize the facilities of the reliable equipment dealers who call on them regularly. The representatives of these firms are experienced professional men and qualified to assist in the study of equipment requirements. These representatives in turn can call on manufacturers

for guidance and assistance. Many manufacturers of educational equipment annually spend thousands of dollars in research, development and testing of their products to give schools the best quality product possible, at a fair and reasonable price.

Factory-trained representatives of equipment distributors can show many samples of classroom equipment or complete installations. They will coordinate the views of educators, examine available equipment and make detailed layouts of the desired equipment to fit particular spaces. They will assist in writing the standards for specifications for the equipment needed.

A school system can buy quality without paying exorbitant prices. High grade equipment will usually last longer, is better engineered, is better guaranteed and, therefore, will pay for itself in actual savings over the life of the equipment, besides being more attractive, more comfortable and more functional.

Once a standard of quality is selected, do not accept a product of lower quality and lower price because a slight savings is apparent. It is actually only the difference in price between the two products that is bought because the price of the low cost item would be paid anyway. This difference in price, spread over the anticipated lifetime of the equipment, may amount to only a fractional part of a penny. The original cost of equipment is soon forgotten but its quality, appearance, and performance are vital and important features for many years to come. Will they stand the test of time?

Careful planning and judicious investment of the tax dollar in buildings and equipment mean a higher educational level for students and a higher standard of living for the entire community.

Educators Manufacturing Co.

Equipment studies and recommendations should be the responsibility of the educational authorities.

Building and equipment costs should be determined together.

Brunswick Corp., Hedrich-Blessing

Basic Purchasing Considerations

by Robert M. Kurtz

Kurtz Bros., Clearfield, Pennsylvania

EVERY SCHOOL plant has certain quantities, kinds, sizes and qualities of furniture and equipment. A definite number of pupils, of different sizes and ages, are accommodated in particular classifications of instruction. All furniture and equipment are enclosed and protected by a suitable building shell. The material components did not spring into being spontaneously. They were designed and chosen according to some plan. And the plan is not always a good one.

When a new school building is considered, it receives first claim in planning, design and cost allotment, and the building contents get what's left. That remainder may be insufficient to provide a proper teaching and learning situation for the students. For instance, school building size may be determined by pupil capacity, classes and activities. Internal facilities are arranged to fit the shell, and the exact quantities, sizes, kinds and qualities of furniture and equipment are established last. This whole procedure could be likened to the shell determining the exact direction of a turtle's progress.

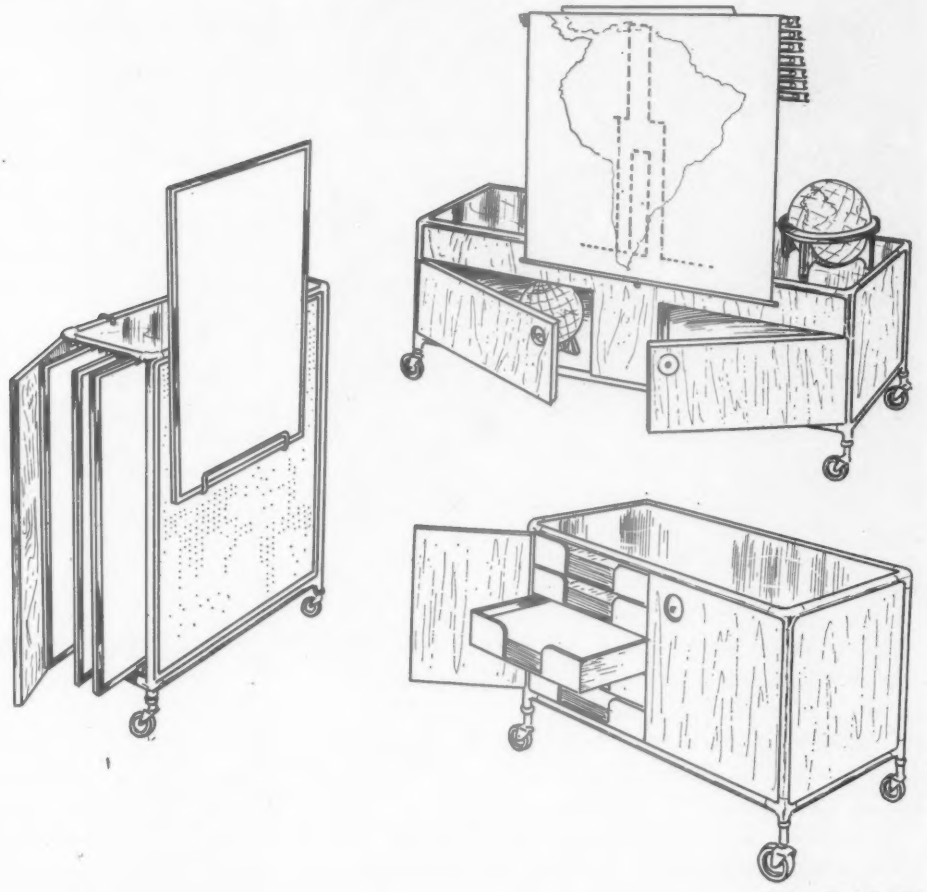
Architects are doing an excellent job in school plant design. But when detailed educational planning must fit internal facilities within predetermined floor areas and under stringent monetary limitations, the result may be chaos. What happens when furniture and equipment requirements must be channeled to fit set limits? Extras in construction may have eaten away at the total building budget. Furniture and equipment requirements will have to be reduced before actual purchase has taken place. The pupil-use facility of the entire project is thus harmfully lessened.

The time to plan furniture and equipment requirements is at the very onset of a new building program. Furniture and equipment costs will amount to approximately 10 percent of the total expenditure. The greatest effort should be made to obtain true value within this figure rather than cut down on the percentage. If a lower total cost is required for the entire building project, it may be wiser to make reductions within the 90 percent rather than the 10 percent.

It is inconsistent with sound educational pro-

American Seating Company

Educational practice dictates kinds of furniture needed in any given area.



Purchase of movable items requires as much preplanning as is usually given to fixed items of furniture and equipment.

Weber Costello Co.

cedure to obtain top-notch teachers and good buildings and then allow only secondary consideration to the furniture and equipment which is the educational *modus operandi.* School furniture and equipment represent an important investment. Their purchase poses two basic problems. One concerns fixed equipment. The other involves movable furniture. Both require definite preplanning. It has been revealed that movable furniture, often purchased almost as an afterthought, receives more actual use than any other. It certainly should not be bought last with low price receiving first consideration.

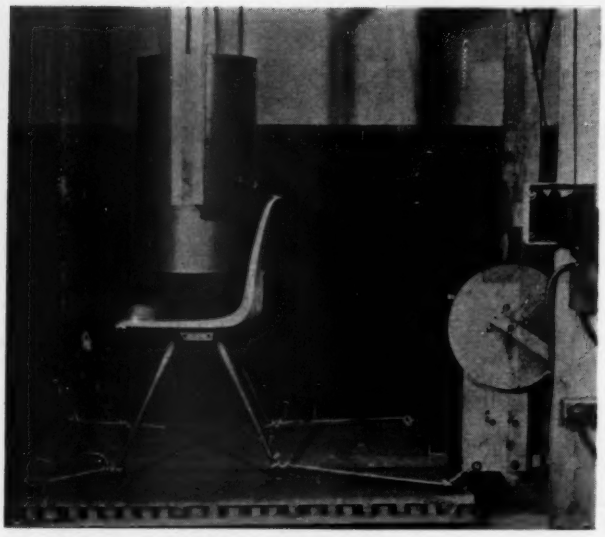
Fixed equipment, purchased after careful selection, may be installed through general contractors and sub-contractors. Such equipment should be chosen by those educators best qualified to determine the need. Sometimes technical knowledge is required. An allowance can be given to contractors to include in their proposals, as a base bid total, with specific alternatives, or by prefiled sub-bids, so that the equipment selected can be known to the contractors beforehand.

A pre-qualification of acceptable equals will eliminate many misunderstandings. This same procedure for movable equipment will have equally good results. Movable furniture probably requires earlier and more careful preplanning to insure enough money for its purchase. It often happens that, after the building has been completed, there are not sufficient funds to purchase the desired qualities or quantities of movable items.

Purchase of either or both types of furniture and equipment naturally requires that the qualities specified are those which will fit the school district's budget. Be sure to specify the qualities wanted, but recognize that an equal will be acceptable. Purchasing an item of lower, or higher, quality than specified can cause misunderstandings, create disputes and confusion, if not illegal procedures.

Every school has to live with furniture and equipment for a long time. Consider the value in quality, price, reliability of the manufacturer, the service, financial responsibility and terms of the distributor, his salesmen's service and other intangibles, as all are inherent factors in the price paid.

Equipment and furniture are the wear-out parts of the school plant. Much of it, particularly movable items, will be replaced one, two or three times during the life of the building. A good quality purchase of value, therefore, may reduce this replacement factor. The purchase by low bid, par-



Manufacturers conduct extensive tests of their products to check quality and durability.

ticularly when items different from, or less than, specification equals are accepted, may logically increase the replacement factor.

The lowest price is not necessarily the most economical one. The best value is usually the best buy in the long run.

A reliable school equipment and furniture distributor and his salesmen know school problems as they know their own products. Work with those who call upon you regularly. They are already aware of most of your basic problems and difficulties. School furniture and equipment should advance the educational program. True economy is achieved when all items support the educational program to the highest degree. Do not confuse cheapness with economy.

No schoolhouse is as important as the children and teachers it shelters. It should contain the necessary furniture and equipment for proper instruction and the desired acquisition of knowledge. All items within a building should combine into a composite whole for a successful climate for learning. Wise purchasing procedures will be the main impetus behind this achievement.

Such tests help insure a safe investment in furniture by schools.

Brunswick Corporation

Getting the Best in Furniture

by S. T. Williamson

Branch Manager, Northern School Supply Co., Portland, Oregon

TEN YEARS of unprecedented school enrollments, coupled with fast moving political and scientific developments, have created a sense of urgency in all Americans to accelerate developments of educational facilities throughout the land. All of this has caused problems for school officials that, to say the least, are frustrating to them and unappreciated by their communities.

One outstanding problem is how to relieve the unending pressures brought on by the public to improve educational facilities without a tax increase. The school official is pressured to provide better and more facilities and is expected to accomplish this without increasing the public's tax burden.

This restriction applies to virtually every purchase of anything having to do with education—from the actual construction of buildings to the supplies and furniture that go into the buildings. Because school officials are public servants, they are expected to purchase anything and everything un-

Kranzten Studio Inc.

Careful selection, judicious buying habits and proper usage of furniture and equipment mean educational benefits for the school district and for the whole community. (Photo courtesy Brunswick Corporation, School Equipment Division.)

der circumstances quite dissimilar to purchasing motivations or methods employed by private enterprise or private individuals. A school official must purchase educational furniture for someone else's use, and pays for it with someone else's money. The person who uses it doesn't pay for it and doesn't buy it, and the person who buys it doesn't use it. So it is not surprising that the fundamental objective is almost forgotten in the process.

That fundamental objective is and should be to acquire furniture that will contribute the most to the physical and intellectual development of students, purchased at a cost within practical budget limitations. Second to this are the interests of the teacher, administrator and taxpayer. But it should not be forgotten that the furniture purchased will be used by students during their most formative years of life.

There are many yardsticks for measuring how well all this is accomplished. First of all, the purchaser of school furniture should evaluate items according to the benefits derived by the student. The simplest way to do this is to view functional requirements with the same degree of inspection an adult would use. Adults demand comfort, beauty, utility in furniture and equipment, according to usage. Our young school population should at least have an equal opportunity to obtain maximum effectiveness from furniture and equipment purchased for them.

Economic pressures force compromises constantly, but school furniture today is available at a cost that by no means parallels the increased cost of other educational facilities. Furthermore, it represents much greater value than it did ten years ago. During the decade of the 50's, all construction costs rose over 125 percent. School building costs alone increased over 50 percent, but the cost of school furniture remained almost level, and even decreased in some cases.

We must not forget that the main reason for building a school is to provide a structure in which people can acquire an education. To put it simply —a structure in which a human being can sit down and learn. It has been estimated that a student will sit at a desk for 15,000 hours of his life (from kindergarten through college) to complete his education. We can at least make sure he is comfortable.

American Seating Company Photos

Budgets for new school buildings should include enough funds for furniture and equipment needs.

Too many building programs are launched without proper consideration of school furniture needs at the very beginning. One of the best ways to assure the acquisition of properly designed classroom furniture is to plan for it when the overall project starts. Some school officials do this most effectively and, as a result, when the time comes to purchase school furniture there are adequate funds to buy the best for their needs. But sometimes the matter of furniture selection gets lost or set aside before pressing problems of construction planning. When the time arrives for the selection of furniture, adequate funds have mysteriously been used up. Avoid this by good planning at the earliest possible stage of the building program.

School officials are assured of getting the best in school furniture (remembering that the "best" means school furniture that does the most for the student) by taking advantage of the knowledge and experience of manufacturers and dealers of reputable firms. Any reliable manufacturer or supplier of school furniture and equipment, to be successful and remain in business, must also remain competitive. He recognizes a burden of public trust—the responsibility of providing school furniture and equipment that contributes to the physical and intellectual development of students. These people have much experience to offer. Consult with and have confidence in the proven reliability and background of reputable manufacturers and dealers.

One standard test in manufacturer's laboratory requires application of 500 pounds of dead weight to seat of folding chair.

School officials are dedicated public servants. They are moving ahead to combat the frustrations and pressures of the past few years. And one way is to help give more students a finer education through wise selection of furniture and equipment.

Physical Requirements for Good Library Service

by Elizabeth Hodges

Supervisor of Library Services, Board of Education of Baltimore County, Towson, Maryland

Miss Hodges is a graduate of the University of Virginia and received her library training at University of North Carolina. She has been a public school teacher and librarian in elementary, junior and senior high schools, and has taught in the library schools of College of William and Mary, Florida State University, University of North Carolina and Madison College.

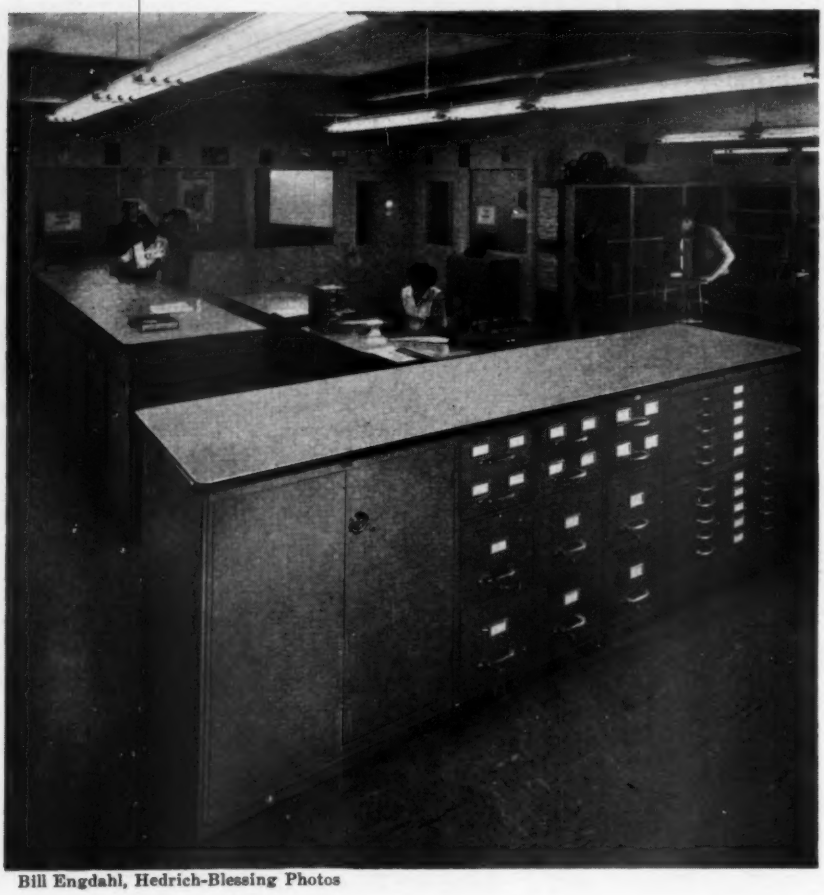
A NEW SCHOOL BUILDING without a well planned library is an anachronism. Educators agree that an excellent school program can be fully achieved only if an excellent school library supports teaching and learning. One basic requirement for a library is a functional and inviting physical environment, designed to accommodate all pupils and teachers who will use it, to house all books and non-book materials needed to serve curriculum areas and personal interests, and to include furniture and equipment essential to efficient operation. New national standards for school libraries[1] state: "Ample space, harmonious arrangements, good lighting, blending and contrasts in colors, functional furnishings, and proper control of sound create an atmosphere in which students and faculty enjoy working and in which learning takes place."

Just as the school building itself should be designed to harmonize with the present and future objectives of the school, so should the library be planned to contribute effectively to the school's educational program as it presently exists and as it is projected by the administration and staff. If truly adequate library quarters are to be achieved, cooperative planning is essential. Architects, administrators, and librarians must work together—the architect supplying the talent and skill necessary to good design and to practical application of ideas, the administrator acting as authority on the school program and on budget limitations, and the school librarian and library supervisor spelling out the physical requirements for excellent library service. These specialists cooperate to develop plans which can be translated into library quarters which combine the artistic and functional qualities necessary to maximum effectiveness.

The location of the library should be determined on the basis of accessibility, freedom from unnecessary noise, and possible future expansion. The library should be nearest the classes which use it extensively. In elementary schools, these would be the upper grades; in high schools, the English, science, and social studies classes. It is highly desirable that the normal flow of classroom traffic should make the library easily accessible. On the other hand, the library should be located *away from* music rooms, playgrounds, cafeterias, bus loading stations and other noisy areas.

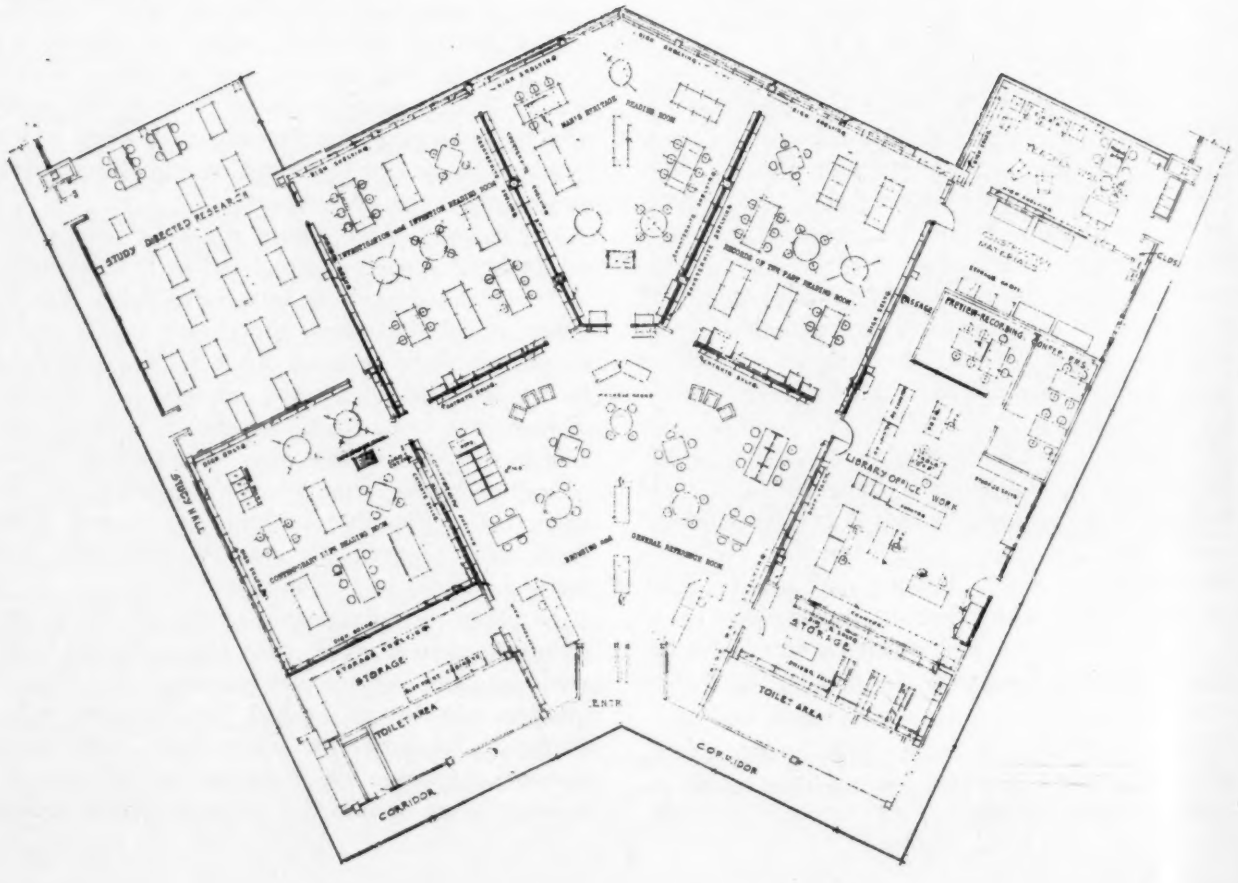
To allow for enlargement of the library as enrollments increase, or as curriculum changes make new materials and services necessary, the original quarters should not adjoin load-bearing walls, stairways, lavatories, or other fixed architectural features. Libraries which extend service into the evening hours or into the summer months should

[1]American Association of School Librarians, *Standards for School Library Programs* (Chicago: American Library Association, 1960), 132 pp.



Bill Engdahl, Hedrich-Blessing Photos

Instructional Materials Center at West Leyden High School, Northlake, Ill., is designed to serve 2,400 students. All types of instructional materials are in one area. Four reading rooms, organized by subject, are available, as well as a general browsing and reference room, and rooms for audio-visual services and professional materials.



be planned for convenient access when the building as a whole is not open.

Space allotted to the library varies with the potential demands upon library service. Such factors as school enrollment, audio-visual materials and, above all, educational program, determine the size of the library. National standards give specific recommendations for areas to be included in the library suite. These state that the library should seat 10 percent of the enrollment in schools with more than 500 students and recommend a minimum seating capacity of 45-55 students in schools having 200-600 students. To allow for the necessary furniture and 5-foot aisles, a floor area of 30-35 square feet per reader is required. Recommended space allotments for other areas cannot be included here, but are stated in detail in *Standards for School Library Programs.*

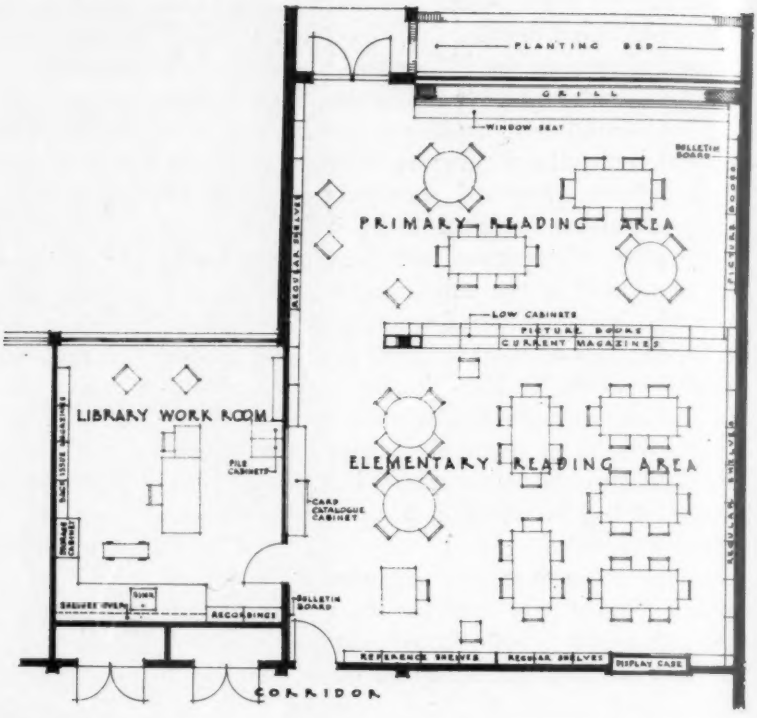
Several separate rooms are needed in a well planned library. For convenience of supervision, the main reading room should seat no more than 100 students, and preferably no more than 80. In large schools where reading rooms of this size would be inadequate, several adjoining rooms or several rooms located at strategic points in the building might be required. Such rooms could be planned to serve students in specified age or class groups; or they might be organized around curriculum areas.

In addition to the main reading room or rooms, office-work-storage space for the library staff, an adjoining classroom for group work or for instruction in the use of the library, and one or more conference rooms are essential in large schools. In small schools (up to 1000) the work-storage area can serve also as a conference room. Careful attention to the arrangement of areas and the use of glass partitions between rooms will reduce supervisory problems and channel the flow of traffic.

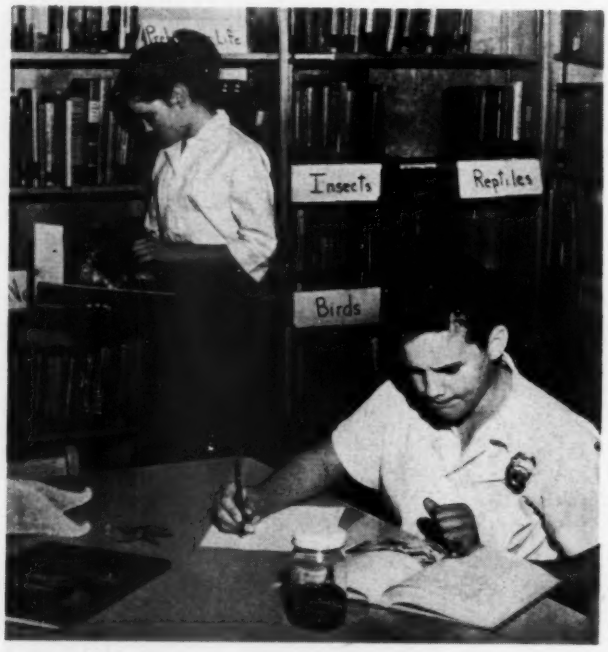
Current trends in education are important to school library planning. The "school within a school" plan usually calls for a specialized library for each subject area, located near the classrooms and laboratories, in addition to a central library used by all departments. New high schools in Huntington and Syosset, Long Island, are examples of such planning. A campus-type school may house the library in a separate building with other common rooms.

Another influence on the school library is the

Photographs and prints are among the items filed at the West Leyden High School Instructional Materials Center. Both storage and work spaces are essential to such a center.



At Guy Webb Elementary School, Fulton County, Georgia, library area is separated according to different types of activity. Areas are defined by placement of shelving and furniture. Below, students are at work on a science project in the library. (Architects of building, Finch, Alexander, Barnes, Rothschild & Paschal.)



attention now being given to grouping. Dr. J. Lloyd Trump, in *Images of the Future*,[2] describes a type of grouping by which classes of 100 or more engage in activities which occupy about 40 percent of the students' time; small discussion groups of 12 to 15 students meet with a teacher for about 20 percent of the school time; and students engage in individual study for approximately 40 percent of their time. A school experimenting with this new idea in grouping would have to provide a meeting room for the largest group, preferably located near the library, several additional conference rooms for discussion groups, and many individual study tables in the library for students engaged in independent study.

Materials centers, now receiving much attention in educational planning, present special problems in designing school libraries. The materials center, ideally, brings together all instructional materials and equipment in one group of rooms, organized and supervised by a single staff. If such a center is included in the school plan, additional space must be allotted to the library suite, special areas must be provided for housing and using audio-visual aids and projectors, and the staff of materials specialists must be increased to provide additional services. Decisions on these points will depend upon the extent and variety of the materials collection and the use made of it. Therefore, close cooperation of the administrator, the librarian, and the A-V specialist is essential. Granted this cooperation, it is possible to achieve the advantages of unified organization without subordinating either service to the other.

However, a compromise may be effected by making the library responsible for organizing and circulating materials, while audio-visual equipment is housed, maintained, and used in another area under the supervision of a specialist in audio-visual instruction, or of a faculty member with released time for these duties. In such compromise situations, the separate areas should be near each

[2]J. Lloyd Trump, *Images of the Future*, National Association of Secondary-School Principals, NEA, Urbana, Illinois. 48 pp.

Librarian needs a work-storage room. (Shown above, work area in Johnnycake Junior High School, Baltimore County, Md.)

other, and the audio-visual specialist and the library staff should work together closely.

Elementary school libraries are equally as important to quality education as high school libraries; therefore the foregoing recommendations apply to all levels. Even so, the problems of planning the elementary school library differ somewhat from those of high school planning, mainly because elementary schools are frequently smaller and because young children are more likely to make group use of the library than high school students are. In elementary schools, classes will visit the library at regular intervals, on a schedule flexible enough to allow for other visits by individuals or groups for reference work or free reading. In high schools, emphasis is likely to be on voluntary use of the library, with scheduling of whole classes made upon request, especially in schools where tight programs include few study periods.

The well planned elementary library provides an area within the reading room where the librarian and the teacher can work effectively with one class, while individuals and small groups from other classes are at work elsewhere. This consideration does not necessarily mean separate rooms; a satisfactory working situation can often be achieved by proper placement of entrances and exits and by an arrangement of furniture and materials which permits scheduled and unscheduled use without serious conflicts.

Shelving for library materials is a major consideration. Any school which hopes to meet national standards must provide shelving for a minimum of ten books per pupil. By estimating ten books per linear foot of shelving, this means that there must be one foot of shelving for each pupil, *plus* the amount of shelving needed for anticipated expansion. This estimate is based upon *full shelves,* a condition extremely difficult to administer. Therefore, a really adequate shelving estimate would require an increase of 10-25 percent over the minimum.

Wall shelving is preferred over floor stacks, but floor stacks are inevitable in a large school. The architect can devise ways of modifying window walls to accommodate high shelving, thus decreasing the amount of floor shelving required. Wherever floor stacks are used, they should be placed where they interfere as little as possible with seating arrangements and supervision.

Several kinds of shelving are needed to house different materials: regular adjustable shelving for most books; deep, divided shelving for picture books; sloping shelves for display of magazines and picture books; and oversize adjustable shelves for reference books and magazine storage. *All* shelving should be built to uniform specifications as stated in *Standards for School Library Programs.*

Other matters which should be decided in conference are: number and location of doors. These

Built-in storage units, like this one for filmstrips and records, are recommended.

should be determined with a view to meeting safety requirements, providing easy flow of traffic, and contributing to effective seating arrangements. Double doors on the corridor wall of the reading room and a corridor entrance to the work area are mandatory.

Lighting and acoustics. Lighting should meet latest standards and should provide glare controls. Light fixtures should be attractive, with switches located at points where they do not interfere with shelving. Ceilings should be acoustically treated to control sound; floor coverings should be rubber tile or similar sound absorbing material, with a plain or small design.

Equipment needed for efficient operation. Recommendations for furniture and equipment are given in *Standards for School Library Programs.* Draperies, informal furniture, good color harmonies, and decorator touches are important factors in creating an inviting library atmosphere. These often result from imaginative planning rather than added expense.

Features to Avoid

Long, narrow library rooms are to be avoided. Badly proportioned areas are not only unattractive, but also create problems of arrangement, supervision and efficient operation. Great expanses of floor-length windows are also undesirable. Such windows reduce space for shelving, cause eye strain, and create problems of decoration and heating. Patterned floor coverings create a "busy" effect and coverings which reflect too much light cause glare.

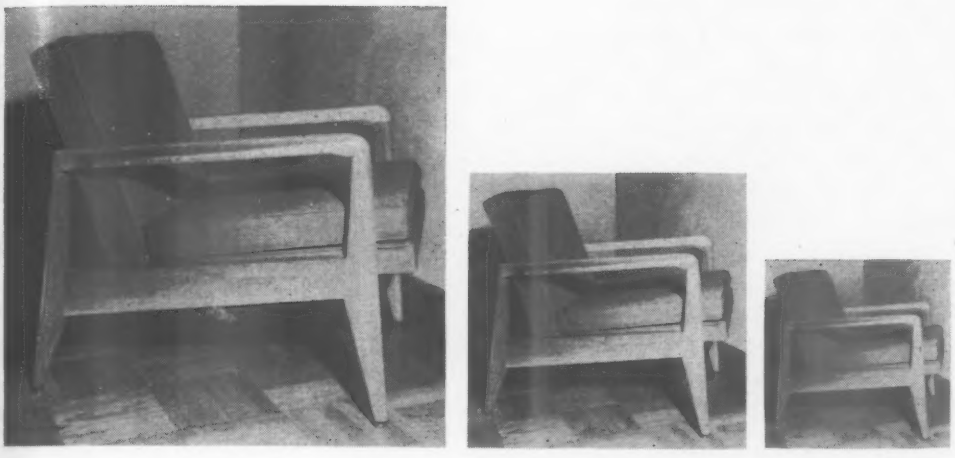
Bookshelves should not vary from standard specifications. An inch of trim extending below the top of a bookshelf can reduce the height of the shelf so much that only tiny books can be shelved. Inadequate shelving is probably the most common mistake made in planning most libraries.

Generalizations such as those given above can only set the stage for school library planning; they cannot include the innumerable details which must be considered if a good plan is to be achieved. Details are best taken care of in official specifications drawn up in advance of actual planning sessions and modified as need arises.

Right now, an indispensable tool for school library planners is *Standards for School Library Programs* (American Library Association, 1960). This publication, developed by the American Association of School Librarians working in cooperation with representatives of nineteen other national organizations, is the most authoritative guide available for administrators, architects, and librarians who need a clear vision of what constitutes an excellent school library program and a better understanding of the physical setting in which such a program can best develop.

Bill Engdahl, Hedrich-Blessing

Easily accessible reference cards and books invite students to use the facilities of an Instructional Materials Center. (West Leyden High School, Northlake, Ill.)



Projecting College Equipment Needs

by Kenneth A. Dick
Comptroller, University of Idaho, Moscow, Idaho

Mr. Dick holds B.S. and M.S. degrees from University of Idaho and a Master of Business Administration from Stanford University. He has been associated with University of Idaho since 1931 and has been comptroller and a professor there since 1946. Mr. Dick is also a lieutenant colonel in the U.S. Army Reserves.

THE COLLEGE WORLD of today is a building world. With each new structure at any institution come hours of planning, conferences, comparison, evaluation and decision. After allocation of funds and final project approval, it is still a long way from the realm of dreams, hopes and ideas to the reality of an existing building in daily use. The transition is in the form of a cooperative venture by professional experts of varied proficiency.

At larger colleges and universities the specific planning function may be delegated to special staff members assigned to prepare for the future. At most campuses, however, this responsibility rests with regular staff members who must plan for the future while carrying out today's daily tasks. In establishing plans and specifications for a building, it is customary to engage architects and consulting engineers. However, in the procurement of equipment and furniture for the same structure, outside professional assistance is not usually sought. More often than not, full responsibility for detailed planning of furnishings remains with regular staff members. (In this article the term "equipment" includes items of furniture.)

Unless the equipment planning function has specific direction and organization, there is danger that a structure will be finished without a full complement of essential equipment or funds for its purchase. A committee or planning team should be appointed by the president's office for each major college or university project. The committee will plan equipment procurement and document its progress with written reports.

Of primary importance to the planning team is the person who has management responsibility for the activity to be housed in the new space. This man might be called the "activity supervisor". Unless his ideas receive serious consideration, he may voice objection to materials after they are purchased or find they do not suit his operation.

The activity supervisor might be the librarian,

if a library is being erected; the union manager if the building is a student union; the chairman of chemistry, the director of athletics, or the director of dormitories. He is always there with his opinion on the nature and design of the items of equipment needed—and wanted. He is closest to the specific requirements of his building.

Other members of the planning team for equipment procurement should be the purchasing agent, the university engineer, and the business officer. Each can make contributions according to his professional background. The purchasing agent knows sources of supply and details of quality; he can direct the competitive procurement procedure. The university engineer has a wealth of technical background which should be drawn upon to evaluate potential performance of equipment and to balance equipment specifications against physical plant requirements. The business officer can correlate actions of the team, give it direction, and assure satisfactory results in compliance with policies of the institution. Well-defined principles should permeate the whole planning program.

Five objectives can be attained with a sound plan for equipment procurement. These objectives are:

1. Financial planning to assure allocation of funds to obtain sufficient equipment of the correct quality, with limitation of expenditures to the funds provided.
2. Selection of equipment with best design and quality features to meet specific requirements of proposed use – the right equipment for the right job.
3. Selection of equipment which offers ease of maintenance, durability and economical repair.
4. Complete and full play of competition among suppliers.
5. Acceptance of selected equipment by the user—the project supervisor.

Custom-built dormitory room assembly includes desk, desk lamp, bookshelf, chest, medicine cabinet, mirror, and wardrobe.

Financial Control

In the very early stages of a project, serious attention should be given to new items of equipment needed, what present equipment can be reused and what additional equipment will be necessary. The activity supervisor should compile a master list of equipment requirements. If these items are identified by priority of need—what is essential for basic operation and what is desirable for optimum operation—administrative review of the request will be implemented, especially when limited resources later require modification of purchases. The master list should be established during initial planning stages. Often the initial development of plans is based on a "guesstimate" lump-sum, which later proves to be unrealistic, inadequate and without concurrence of the activity supervisor. Too frequently the identification of articles of equipment is postponed until the project becomes a reality. When a shortage of funds does materialize, first preference is given to construction requirements, and equipment deficiencies become a pressing problem for the future.

The master list, submitted to the team director, carries general item descriptions from which the purchasing agent determines cost estimates and formulates the project allowance for equipment. Once established and approved, the list becomes a control over expanded wants, either for additional items or more elaborate and costly ones. These usually come with the passing of time, as the dream of new quarters approaches realization. Difficult as it is to anticipate needs from blueprint drawings, this task must be successfully accomplished for effective planning.

With development of the project, detailed and exact descriptions must be furnished the purchasing agent by the activity supervisor in time for an orderly call for bids. If such work is done under pressure, the risk of error and high cost is great. The building completion date should be correctly

New Mines Building is still under construction at University of Idaho, Moscow, but equipment needs were planned months ago.

forecast so essential equipment will arrive when needed. Delivery dates should be specified on purchase orders to avoid either early or late arrival, each of which has problems. If items arrive before they can be placed directly in the new structure, there are storage problems and handling costs. The equipment plan should indicate whether handling, storage and moving costs are to be borne by the project and, if so, make budget provision for them. It sometimes happens that no provision is made for this until too late. The cooperative efforts of all members of the equipment planning team can alleviate such complications and assure acquisitions within the funds provided.

The Right Equipment

Paramount, and overriding all other objectives, is the need to obtain equipment that will do the job—in the prescribed manner and in accordance with modern day concepts. The problem is that most equipment planners face a once-in-a-lifetime experience. Each project brings a new activity supervisor to work closely in concert with the planning team. They will survey equipment in production or even on the factory drawing board, and decide which is best designed and manufactured to meet needs of the particular operation.

The past decade has brought innovations in all types of institutional equipment. These are direct results of technological improvement, imagination of designers, users' demands for eradication of past weak points, and the modern fancy for color. In general, the qualities, characteristics and trends expressed in design of modern furniture have advanced so rapidly that standardization, except on a very short term, is a policy which risks the advantages of improvement. Consequently, even with repeated building projects, such as dormitories, it is necessary to review the field for each major building project.

With the rapid advance in technology and the resulting specialization of material design and equipment, it is to be expected that general-purpose, or multi-purpose equipment must give way to specialized products for specific requirements. What may be the best in one case may be unsatisfactory elsewhere. And often a minor feature of limited cost on a particular item may make it of high value-in-use over a competitive item.

Important also is quality. Intrinsic high quality does not in itself make a product superior and could lead to waste. Over-design is a fault which attracts many a prospective purchaser. It is up to the activity supervisor and the purchasing agent to work together to judge each item in terms of use requirements. The supervisor knows the equipment used in his field. He can evaluate individual technical features of respective brands. His opinion and judgment are tempered with guidance from the purchasing agent who draws upon a reservoir of general knowledge of materials and equipment, and who is prepared to investigate and test innovations. With such guidance, equipment is chosen

on a rational basis, avoiding personal fancy and prejudice, or the erroneous acceptance of sales promotion as facts. Differences in opinion will come, but the objective of selecting the right equipment for the right job should guide all.

Maintenance Considerations

Initial purchase price is neither the final nor the total cost, although it governs purchase awards on a lowest price basis. If possible, every cost in connection with the use of the equipment during its lifetime should be computed and given full recognition. Items like business machines must have service. Consider, at the time of purchase, how frequently periodic service may be needed, the cost of such service, whether service is readily available and whether a call brings prompt response. An idle machine and operator, awaiting a tardy service man, are expensive.

Ingrained in the young male species is a force which seems to obtain recognition and satisfaction from destruction and defacement of property, with special attraction to flat surfaces, such as desk tops, which succumb to the pressure of a pencil, a pen knife, or other carving instruments. New plastic materials have eliminated many major costs of refinishing arising from this problem. The cost-in-use of new dormitory desks without this modern protection must necessarily come high, regardless of initial cost.

In recent years chair designers have recognized that chair arms and legs do break, and covering fabrics do wear, tear and burn, and they now offer chairs so designed that repairs can be quickly and easily accomplished without specialized labor. The resulting low repair cost greatly influences evaluation of the initial price. A similar cost-saving design has been the wall-saver feature of extended rear legs for chairs, which keeps the back of the chair from marring the wall and saves the expense of frequent redecoration.

New products and new materials are introduced constantly, necessitating a testing program and evaluation of the quality of products and the merits of producers' claims of superiority. As equipment lifetime is extended, durability improved, and maintenance and repair requirements simplified, the cost-in-use is decreased. These factors necessarily influence original selections.

Selection of appointments for this living room began in early planning stages with requests for flexible project proposals from those concerned.

Installation and service lines for laboratory tables require proper mechanical specifications.

The economy of the United States has been built upon the concept of the freedom of individual choice for which the cornerstone is free competition. Likewise, efficient and effective college and university purchasing relies upon free competition. If an institution, private or tax-supported, is to receive maximum, full value for its purchase dollar, it needs to accomplish complete and full play of competition among all sources of supply.

Within any college or university there exists a multiplicity of reasons why one brand product should be purchased over another, or why a particular source of supply should be favored. Some of these reasons are not without merit. There are times when a brand product is purchased as part of a larger assembly or to harmonize with existing equipment; or a product has given years of outstanding satisfaction and the user is reluctant to change.

When a certain product is unique in its features and has no existing competitor, it may be the sole choice. This situation arises quite often in the electronic and medicine lines. Yet there are occasions when personal fancy will dictate that a product is superior for reasons of health, scientific requirement or performance. So, purchases without competition do exist. In every case where a major purchase is made on a preference basis and competition is stifled or abolished, the efficiency of the purchasing program is decreased. The absolute need for purchases based on personal preference is subject to question. Usually there is a better way.

The incentive is not to purchase materials at the lowest possible price only to save money as such. Contrary to the belief of many, business officers and purchasing agents do not live to save money and accumulate monetary resources. They recognize that, within any institution, money is saved in one area only to be spent in another. The underlying incentive is to obtain the greatest amount of equipment and material of the best quality with the funds available. The educational program thus has the maximum tools possible and the taxpayer or donor receives the greatest return for his dollar. No dedicated college administrator wishes to purchase one article in competition with another only because it requires fewer dollars per item—irrespective of whether the selected item will meet the test of optimum quality and satisfactory service. Price is actually secondary to quality and service and should always be held so.

Fairness to potential vendors requires that each has equal opportunity to acquire the business on an announced basis known and observed by all. If preferential treatment is to be based on geographical location, past relationships, or any other reasons, such policy should be set by the highest authority within the institution, and announced that all might know of the inequality. Specifications should be clear, and the basis of consideration and award definitely indicated.

From information furnished by the activity supervisor, the purchasing agent draws up detailed specifications with instructions to bidders on award procedures. Complex specifications require a longer time between the announcement of proposals and the formal opening of bids. Public advertisement for bids eliminates a potential charge of closed negotiations and serves a vital purpose for tax-supported institutions, whether required by law or not. In small communities, if full competition is to be obtained, it is still necessary to mail requests for quotations to removed prospective dealers, even though announcement is made by public advertisement.

Specific features required in the contemplated equipment should be described in detail in the specifications when custom design and construction are indicated. However, reference to an existing manufactured item of general availability reduces

Lens-Art

Wood screen hides serving area.

substantially the need for blueprint detail and can be of great assistance.

Calling for Bids

Call for bids may be formulated by any of the following five methods. Which is most appropriate depends upon the conditions surrounding purchase and the type of equipment.

1. Specification of name brand only: eliminates need for detailed description and may also eliminate general competition. If the brand item is carried by many supply sources, some competition may be obtained among distributors. If the geographic area is served by a sole distributor, competition is nonexistent.

2. Specification by brand reference with provision for an "or equal" presentation: especially useful when complete description would be difficult. It is often used in the purchase of a vehicle or a furnace, when detailed description would defy most purchasing agents. Reference to a specific model or a general standard manufactured article effectively conveys the desired quality and price area. It should be recognized that differences of opinion might arise as to whether a competitive item is equal, but this decision must remain with the institution.

3. Specification by brand reference with provision for an acceptable substitute: similar to the "or-equal" provision, but does allow competitors more leeway in presenting items of varying quality and price, supported with arguments to show the substitutes are in best interest of the institution. It opens the way for new articles with improved design or better materials.

4. Detailed descriptive specifications: the most difficult to prepare since all materials and equipment are described in detail. Use of this approach is infrequent for description of equipment, being drawn upon only when an article must be constructed in accordance with design. The person developing such specifications must have full knowledge of all details in the manufacturing process. This method eliminates counter proposals or suggested alternates.

5. Project proposal: especially useful when the institution desires to obtain original concepts of design, color and materials, and to assure that separate parts of a project will harmonize into a unified appearance. It has been used for furnishing an area such as a club room or a dormitory living room. Specifications should carry a control schedule describing the units to be included, such as the number of chairs, lamps, davenports, tables, draperies and rugs, but the bidder should be free to advocate his favored style, color, design or fabric and to indicate the inclusive price. The institution can then equate the competitive packaged proposals with indicated costs.

Even with principles and objectives agreed upon,

Lens-Art

Piano is part of lounge furniture.

differences still arise because the interpretation of standards and their application is a matter of personal evaluation and reaction. Different people see the same set of facts differently. An occasional true and unbiased difference of evaluation is inescapable; then efficient purchasing becomes an art.

Fundamentally, the studied conclusions, opinions, desires, predilections, prejudices, fancies, whims and partiality of the activity supervisor should be recognized, if not accepted. It is his operation and every effort must be made to satisfy him and to obtain his acceptance of the final decisions made and actions taken. To ignore his position is to confirm the concept of "administrative bureaucracy".

Almost all differences dissolve in the normal routine, allowing the aggressive and effective salesmanship of a purchasing agent to accomplish miracles. But when differences become insoluble, they are transferred to the business officer. If it is apparent that the activity supervisor would wantonly discard and violate basic regulations and objectives to the detriment of the institution, then there is no alternative but to forward the differences to the president for decision.

Contract Provisions

Procurement of equipment and the development of building construction plans are not unrelated functions. Many equipment items require provisions in the design for installation or connection with utility services. Equipment may be classified as: (1) moveable; (2) either moveable or attached, according to choice; (3) attached and requiring utility services; and (4) attached and considered part of the building.

It should be decided early in the planning which equipment will be included in construction contracts and which will be procured through normal purchasing procedure. Early selection of articles requiring utility services means that water, gas, air, chemicals, electricity or waste lines will be in the right place. For a science building, especially, coordination between building specifications and equipment design is essential to assure that utility connections are correctly located. Some equipment will be chosen even before final draft of the building plans.

There are advantages to including attached equipment in the construction contract, provided the owner retains the right of review before final selection. Remember, however, that a contractor's price for equipment will include a mark-up for overhead and profit. College officials must weigh the possible added cost against the benefit of having the architect design the equipment and the contractor install it. The university engineer will be helpful here to review, before final selection, those items considered to be integral parts of the structure.

For instance, for dormitory rooms there is a choice between moveable or attached units of furniture. Loan requirements or layout preference may indicate either. A further choice exists for attached units between custom-construction-on-site and factory production. The active interest of the architect usually terminates with occupancy of a building. Physical plant officials live with the structure and come to know the experience-in-use of many materials and manufacture. Furthermore, unification of campus equipment may require particular stipulations. So there is no easy way to select new equipment.

A Successful Outcome

Ideally, then, equipment planning for colleges and universities should be delegated to a separate staff which, by specialization, can become expert both in developing building plans and projecting equipment needs. If the administrative structure cannot support such a staff, then equipment plans become the responsibility of an operating committee appointed from among the working staff and of an activity manager for each particular project. Planning teams are formally designated for each major project, with full recognition of responsibilities. Acquisition of the best equipment for each use, with realistic conservation of financial resources, should be uppermost in the minds of all. Dedicated effort and clear objectives will mean a successful equipment procurement program.

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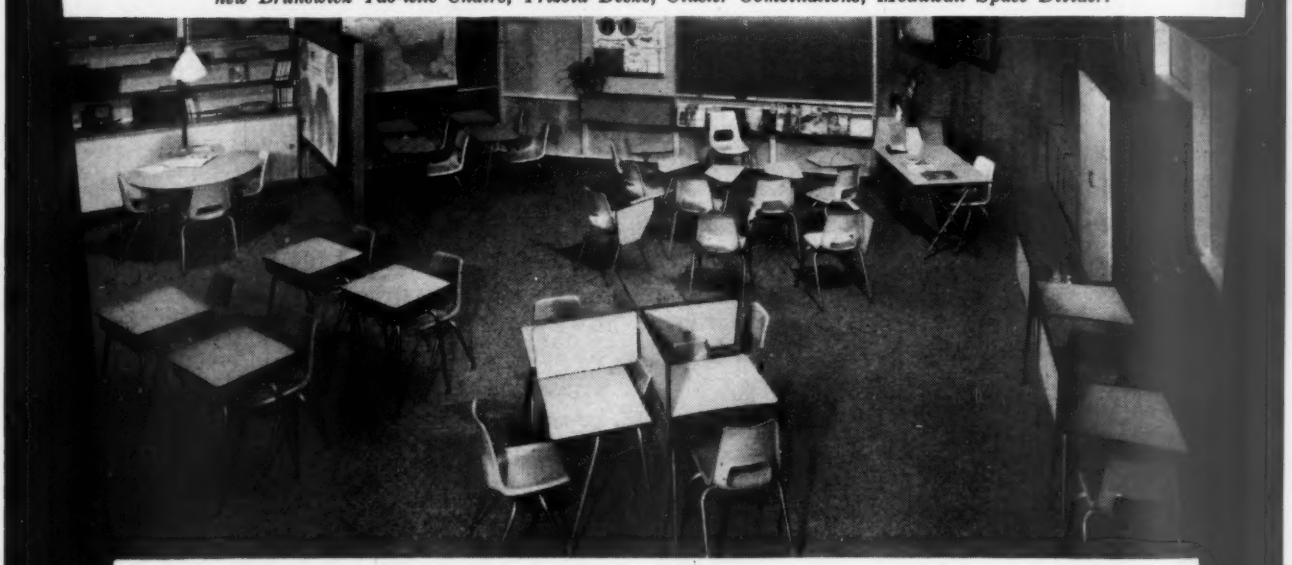
Brunswick

Shown: (above) *upper grade lecture-demonstration area and* (below) *isolated group arrangements using new Brunswick Tab-lette Chairs, Trizoid Desks, Cluster Combinations, Moduwall Space Divider.*



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SERIES **EA**

FEATURES RUBBER EXPANSION SOCKET FOR METAL TUBING

Rubber expansion socket can be supplied to fit round, square, or graceline tubing.

DOUBLE BALL BEARING SWIVEL CASTER
High quality caster especially designed for tubular metal beds, racks, tables and other institutional equipment. Rubber expansion socket expands to achieve 100% wall contact inside tubular metal leg.

Wheel Dia.	Face	Style No. Ruberex Wheels (Soft Tread)	Style No. Plaskite Wheels (Hard Tread)
1⅜"	47/64"	EA458	EA358
2"	13/16"	EA459	EA359
3"	13/16"	EA4520	EA3520
3"	13/16"	EAE4520	EAE3520
4"	1"	EA4521	EA3521
5"	1"	EA4522	EA3522

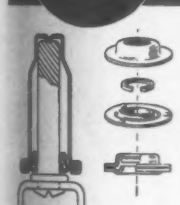
Standard with Cadmium Finish

"EA" CASTER EXPANSION SOCKETS

Socket No.	I.D. Approx.	Socket No.	I.D. Approx.
For Round Tubing			
*40	.594—.620	166	.894—.902
*41	.684—.719	175	.992
155	.759—.777	157	1.072
†156	.844	158	1.310
†156A	.844	159A	1.682
167	.872	159	1.830
For Square Tubing			
160	.930	162	1.370
161	1.180	165	1.885
For Graceline Tubing			
163	1.180	164	1.430

*Available only with 1⅜" and 2" diameter wheel.
†Overall length of 156—2¼", 156A—1 13/16"

SERIES **ES**



ES SOCKET spring grips caster stem firmly, prevents caster from falling out.

LIGHT DUTY CASTER FOR TUBULAR EQUIPMENT
Superior Double Ball Bearing Swivel Stem Caster will fit all sizes of tubular metal furniture and equipment. Stem takes "ES" style socket (select proper socket from table below).

Wheel Dia.	Style No. Ruberex Wheel (Soft (Tread)	Style No. Plaskite Wheel (Hard Tread)
1⅜"	ES458	ES358
2"	ES459	ES359
3"	ES4520	ES3520

Standard with Cadmium Finish.

SOCKETS for "ES" and "S" SERIES CASTERS

Skt. No.	O.D.	I.D.	Skt. No.	O.D.	I.D.
For Round Tubing			126	1¼"	1.072
120	⅞"	.777	126C	1¼"	1.072
121	1"	.810	127	1¼"	1.120
123	1 1/16"	.872	127A	1¼"	1.120
123A	1 1/16"	.872	127C	1¼"	1.120
124	1"	.844	129	1 29/32"-1.9"	
124A	1"	.844			1.816—1.830
124C	1"	.844	For Square Tubing		
125	1"-1 1/16"	.894-.902	131	1½"	1.430

SERIES **S**

WHEEL BRAKE ON SERIES S CASTER
Friction Brake, on Pivot Bearing Stem Caster for tubular metal equipment, provides positive locking device for wheel. Pressure on end of foot lever forces friction plate into contact with wheel, thereby preventing motion; pressure on opposite side releases wheel. Friction Brake is available on all Double Ball Bearing Casters with 3", 4", and 5" Ruberex wheels and all 2", 2½", 3", 4", and 5" Pivot (top) Bearing Casters.

SERIES **2400**

CART AND STRETCHER CASTER

Companion to Series 2800 Rigid Stem Caster

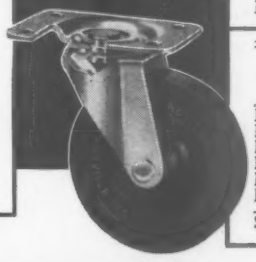
DOUBLE BALL BEARING SWIVEL STEM CASTER
The Series 2400 Caster completely eliminates the shimmying associated with ordinary swivel-type stem casters. Quiet in operation, this easy rolling caster is ideal for use on tray carts and stretchers.

Rust Proof Finish

Style No. Rubber Tired Wheels (Renewable Tires)	Wheel Dia. x Face	Style No. Ruberex Cushion Tread Wheels	Wheel Dia. x Face
2417-5	5x1½"	2423-5	5x1½"
2417-5N	5x1½"		
2417-8	8x1½"		
2417-8R	8x1"		
2417-8N	8x1½"		
2417-10	10x1"		

Letter "N" indicates Neoprene.
Letter "R" indicates Round Tread.

SERIES **EP**

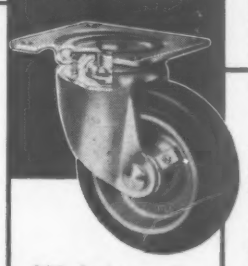


LIGHT DUTY SWIVEL PLATE CASTER
Designed for institutional use on chests, utility trucks, and other mobile equipment, this quality, easy-swiveling caster has two complete rows of ball bearings operating in lubricated, hardened raceways. Companion Series RP Rigid Caster is available.

Caster No.	Kind of Wheel	Dia. of Wheel	Mounting Hole Spacing	Lbs. Cap. Each
EP 3520	Plaskite	3	1¾ x 3	100
EP 4520	Ruberex			100
EP 3521	Plaskite	4	1¾ x 3	125
EP 4521	Ruberex			115
EP 3522	Plaskite	5	1¾ x 3	135
EP 4522	Ruberex			125

Standard with Cadmium Finish.

SERIES **900**



900 Series available with grease seals to protect swivel and wheel bearings. Specify GS, EG, 923-5GS.

MEDIUM DUTY SWIVEL PLATE CASTER
Quality constructed with Double Ball Bearing Swivel, the Series 900 Caster gives continuing good service under many types of medium-heavy institutional equipment—housekeeping and utility trucks, food conveyors, etc. Companion Series 9700 Rigid Caster is available.

Caster No.	Kind of Wheel	Dia. of Wheel	Mounting Hole Spacing	Lbs. Cap. Each
PLAIN BEARING WHEEL				
921-5	Ruberex	5	4⅛ x 4½	300
921-6	Ruberex	6	4⅛ x 4½	410
ROLLER BEARING WHEEL				
923-5	Ruberex	5	4⅛ x 4½	300
931-5	Plaskite			600
923-6	Ruberex	6	4⅛ x 4½	410
931-6	Plaskite			750
923-8	Ruberex	8	4⅛ x 4½	400
931-8	Plaskite			650

Lustre Green Lacquer Finish.

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For Metal And Wood Equipment

FAULTLESS QUALITY CUSHION GLIDES
Large rubber cushion insert absorbs shock. Smooth, flat base slides easily over floor surfaces. CSS Glide (top) has machine screw for use on metal equipment. CNS Glide (bottom) is easily nailed to wood furniture.

CNS GLIDES		CSS GLIDES	
Glide No.	Base Dia. (In.)	Glide No.	Base Dia. (In.)
CNS 078	⅞	CSS 078	⅞
CNS 116	1 1/16	CSS 116	1 1/16
CNS 114	1¼	CSS 114	1¼
CNS 112	1½	CSS 112	1½

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2900 LINE SUSPENSION FILES
Silent, effortless operation. Deluxe full-suspension cradle. Independent inner frame. Two to five drawer heights, legal or letter widths.

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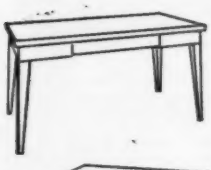
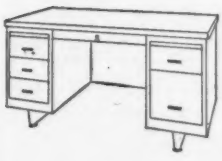
Quiet operation. Full suspension cradle. Sturdy inner frame. Two to five drawer heights, legal or letter widths.

1500 LINE NON-SUSPENSION FILES
Silent operation. Maximum filing space at minimum cost.

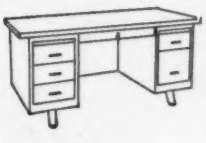


3000 AND 4000 LINE TABLES
Clerical, executive, conference models. Panel styles: 46", 60", 72" x 30". Leg table styles: 30" x 18" to 72" x 30".

5041CD TEACHER'S OR CLERICAL DESK
Reinforced pedestals, tapered island bases, nylon glided drawers with positive center drawer lock.



4060 PRINCIPAL'S DESK
Molded pedestal bottoms and corners. Full suspension file drawers. Dictation shelves, automatic lock.



6072 SUPERINTENDENT'S DESK
Molded pedestals and bottons, nylon glided drawers, suspension file drawers. Two-tone decorator colors, brushed chrome legs, stainless steel trimmed tops.

FASHION-AIRE EXTENDED TYPEWRITER UNIT
Right or left-hand models. Rigidly reinforced 18" x 30" linoleum tops.

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THE NEW Schoolmaster Line

Schoolmaster desks are available in 30" x 48" single or 30" x 60" double pedestal models. Laminated hardwood tops, surfaced with melamine plastic in natural wood grain, 1⅛" thick, veiled with rounded melamine plastic edge. Nylon glided 12¼" x 11" x 24" file drawers, and 12¼" x 5¼" x 24" box drawers with dividers are interchangeable.

SC3060 Double Pedestal Educators' Executive Desk

SC3048 Single Pedestal Teachers' Desk

Schoolmaster features:

- **Attractive laminated plastic work surfaces won't warp, chip, crack or peel, wipe clean with a damp cloth.**
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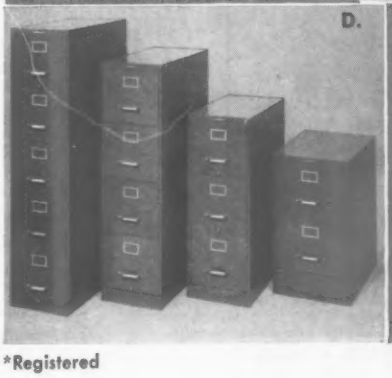

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General Offices and Factory, Muncie, Indiana

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Classic

No. 418

THE ULTIMATE IN PORTABLE SEATING

This completely new concept in folding chairs is now available for buyers who want the finest. Higher seat dimension for more comfortable seating at banquet tables. Contoured, padded back and heavily-padded seats assure maximum comfort. Gracefully-tapered legs have self-leveling Marlex glides . . . for years of silent service. Available in new color and fabric combinations. Write for details on this and other quality chairs available from DURHAM.

TESTED AND APPROVED BY LEADING INSTITUTIONS FOR OVER 50 YEARS

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The very best all-steel chair made. Here is a chair with no compromise on quality.

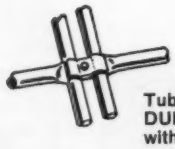
No. 605R—Heavy-duty chair in all-steel channel-frame construction . . . for buyers with strict budgets.

No. 877—Added luxury of an upholstered seat on the best all-steel chair.

No. 868—Both upholstered seat and back for long-session comfort . . . plus smart styling.

No. 251—Strongest, safest juvenile chair with ladder back styling in tubular frame. A complete line of tubular and channel frame juvenile chairs available.

No. 875TA—A truly versatile folding tablet-arm chair. Has rack for wraps.



Tubular or channel frame chairs in the DURHAM line are easily ganged by clamps with wing nuts.

No. 555 STACK CHAIR—A non-folding chair with folding chair convenience and utility. Rubber bumpers protect in stacking. Easy to handle . . . only 11 lbs. Cuts setting-up and clean-up time. Chairs in stacks roll on dolly for easy storing. More people seated in less space. Available in all-steel or vinyl-clad steel seats and backs.

Durham

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SHWAYDER BROS.
Institutional Seating Div.
Dept. AS-61, Detroit 29, Mich.

Samsonite CHAIR BUYER'S GUIDE

HOW TO BUY A FOLDING CHAIR IN 6 EASY LESSONS

1 STEP ON IT! Step hard on back rest (as shown). With Samsonite chairs, observe: contour steel back won't give an inch. No back rest made is stronger—or more comfortable!

2 STAND ON IT! Stand on rear of seat; lean back. It's Samsonite —so don't worry. Samsonite chairs *never* tip over. Perfectly balanced. Amazingly strong, too.

3 "UNBALANCE" IT! Place book or pads under leg of chair. Sit, as shown. If chair tilts or wobbles, it's not a Samsonite. All Samsonite folding chairs are *self-leveling.*

4 TORTURE IT! Lift front legs off floor; "walk" chair as shown. Only Samsonite's super-strong construction (electrically welded tube steel) can take this kind of punishment.

5 FOLD IT! Grasp chair back; put foot on cross brace; pull gently. Samsonite chair will fold easily. Place finger in seat hinge. No danger. Samsonite *safety* hinge can't pinch.

6 SIT IN IT! Instantly you'll know the difference. Note: Samsonite folding chairs are contour-designed (both seat and back rest) for maximum comfort. Good looking, too.

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Samsonite
FOLDING CHAIRS

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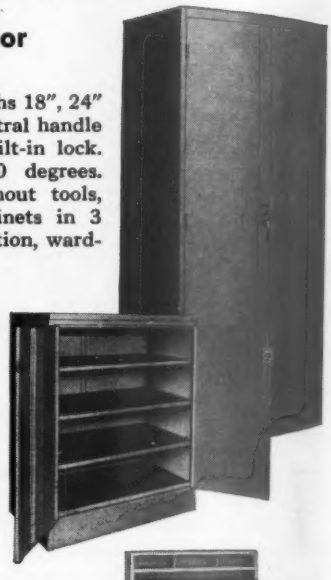
meet the needs of schools and universities everywhere

Borroughs Cabinets are available in spring green, dark green, fall tan, brown, gray.

Swinging-Door Cabinets

Heights 42", 78"— depths 18", 24" — width 36". Single central handle with Yale & Towne built-in lock. Doors swing open 180 degrees. Shelves adjustable without tools, nuts or bolts. 78" cabinets in 3 styles—supply, combination, wardrobe.



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Bookcases and Supply Cabinets

Heights 29", 42", 78", 84"— depths 12", 18"— width 36". The 78" and 84" units are obtainable with open or closed backs, single or double face. Sliding shelves adjustable without bolting.

Sliding-Door Cabinets

Heights 29", 42", 78"—depths 12", 18"— width 36". The 29" and 42" units have steel or glass sliding doors — 78" cabinet has steel sliding doors. Sliding shelves adjustable without bolting.

Library Shelving

Heights 42", 84", 90"— width 36". Open or closed backs — single or double face. Open back units have corner bracing. Sliding shelves, 9¼" deep, adjustable without bolting, on ¾" centers.

"Minute Man" Racks

Compact, flexible, easy to assemble or transport. Hold maximum number of garments in minimum space. Suspended "Wonder Bar" can be reversed to increase hanger capacities. Bar and shelf can be lowered for children's use.

Steel Shop Equipment

Borroughs' line includes Work Benches, Tool Stands, Utility Carts, Shop Desks and Tables, portable and semi-portable Work Bench Kits, and a wide line of Accessories. The rugged Work Benches are readily adaptable to many different bench and table combinations.

DE BOURGH MANUFACTURING CO.

2924 27th Avenue South, Minneapolis, Minnesota

The ALL AMERICAN *Fully Ventilated* Athletic Locker Line

ALL-AMERICAN *Junior*

A full length, 3 locker unit. Each locker complete with shelf, 1 double shelf hook and 2 single wall hooks.

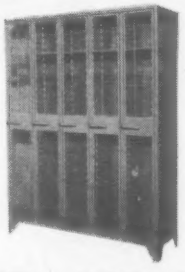
One and two locker units available for fill-in only.

PREFERRED COAST TO COAST FOR: MAXIMUM AIR CIRCULATION • BETTER DRYING •

ALL-AMERICAN *Senior*

Our largest, full length, 3 locker unit. Each locker complete with shelf, 1 double shelf hook and 2 single wall hooks.

One and two locker units available for fill-in only.



ALL-AMERICAN *Sophomore*

A full length, 5 locker unit. Each locker complete with shelf, 1 double shelf hook and 1 single wall hook.

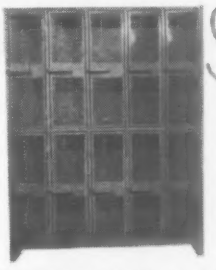
One, two, three and four locker units available for fill-in only.

GREATER STRENGTH • COMPLETE ADAPTABILITY • MORE ROOM, LIGHT & CLEANLINESS

Senior Double Tier

A large, 6 locker, 3 column unit. Each locker complete with 1 double shelf hook and 2 single wall hooks.

One and two column units (2 and 4 lockers) available for fill-in only.

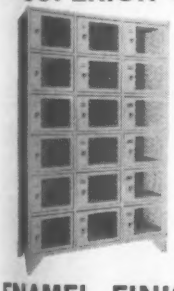


Sophomore Double Tier

A 10 locker, 5 column unit. Each locker complete with 1 double shelf hook and 1 single wall hook.

One, two, three and four column units (2, 4, 6 & 8 lockers) available for fill-in only.

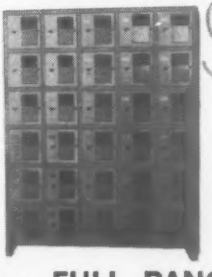
• SUPERIOR SAFETY AND PROTECTION • ATTRACTIVE APPEARANCE • SEVEN BAKED



Senior Gym Locker

A Deluxe storage unit with 18 compartments. Each compartment complete with number plates.

One and two column units (6 and 12 compartments) available for fill-in only.



Sophomore Gym Locker

A storage unit with 30 compartments. Each compartment complete with number plates.

One, two, three and four column units (6, 12, 18 & 24 compartments) available for fill-in only.

ENAMEL FINISHES (OR CUSTOM FINISHED) • FULL RANGE OF OPTIONAL EXTRAS •

Locker Designation	Individual Locker Size W D H	Overall Height of Units W/Legs	W/O Legs	W/Base	Overall Width of Units 1 Col.	2 Col.	3 Col.	4 Col.	5 Col.
JUNIOR	16"x16"x60"	66"	61"	64"	16⅛"	32⅜"	48"		
SENIOR	18"x16"x72"	78"	73"	76"	18⅛"	36⅜"	54"		
SENIOR DOUBLE TIER	18"x16"x36"	78"	73"	76"	18⅛"	36⅜"	54"		
SENIOR GYM LOCKER	18"x16"x12"	78"	73"	76"	18⅛"	36⅜"	54"		
SOPHOMORE	12"x16"x72"	78"	73"	76"	12 13/16"	24⅛"	36⅛"	48⅛"	60"
SOPHOMORE DOUBLE TIER	12"x16"x36"	78"	73"	76"	12 13/16"	24⅛"	36⅛"	48⅛"	60"
SOPHOMORE GYM LOCKER	12"x16"x12"	78"	73"	76"	12 13/16"	24⅛"	36⅛"	48⅛"	60"

Write for complete Information and Specifications . . . send your blueprints or sketch for recommendations and a free quotation.

DE BOURGH MANUFACTURING CO.

2924 27th AVENUE SOUTH
MINNEAPOLIS, MINNESOTA

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General Offices: 1334 Madison Avenue, Aurora, Ill.

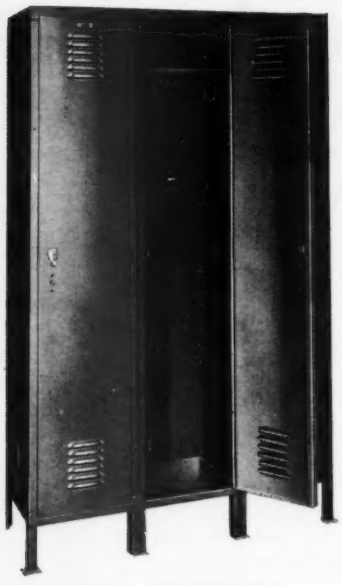
Factories: AURORA, ILL. — YORK, PA. — LOS ANGELES

Sold Nationally through Factory Branches and Dealers

LYON® STEEL EQUIPMENT

MULTIPLE TIER LOCKERS

Most popular of all multiple tier lockers. This locker is ideal for most small storage requirements. Available in 5 high in the following sizes: 12x12x12—12x15x12, and 15x15x12; 6 high — 12x12x12 and 12x15x12; 4 high—15x15x15 (per locker door opening). Gray, green or beige finish.

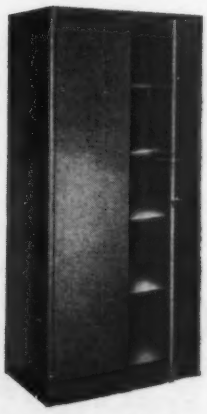


SINGLE TIER LOCKERS

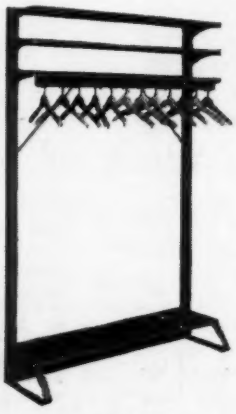
Most practical and widely used of all lockers. Finger-tip handles. Full length clothing storage. Shelf at top for hats, lunches, etc. Available in fourteen sizes from 9" x 12" x 60" to 18" x 21" x 72" (per locker door opening). Gray, green or beige finish.

DOUBLE TIER LOCKERS

Economy in cost and space. Excellent for short period occupancy or where long coats are not worn. Available in sizes from 12" x 12" x 30" to 15" x 15" x 36" (per locker door opening). Gray, green or beige finish.



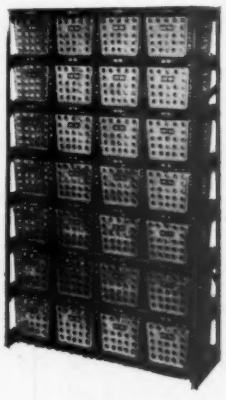
STORAGE CABINETS



COAT RACKS

LOCKER BENCHES

LYON OFFERS A COMPLETE LINE OF LOCKERS AND ACCESSORIES FOR EVERY CLOTHING STORAGE PROBLEM



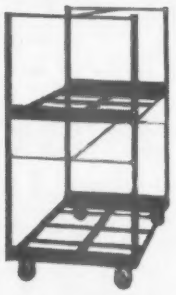
BASKET RACKS

STEEL SHELVING

LYON METAL PRODUCTS, INCORPORATED

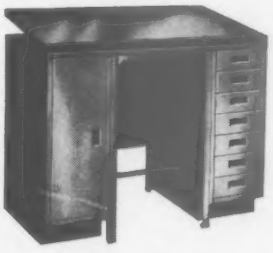
LYON® STEEL EQUIPMENT

FOLDING CHAIRS



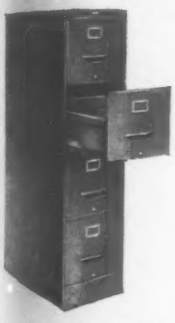
CHAIR TRUCKS

TABLET ARMS



DRAWING TABLES

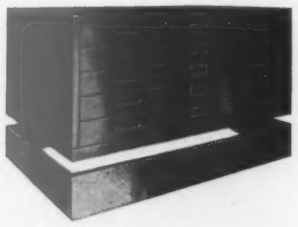
BOOKCASES AND BOOK SHELVING



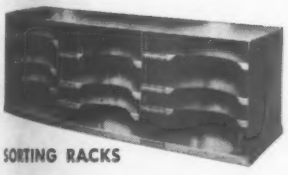
FILING CABINETS

OFFICE DESKS AND TABLES

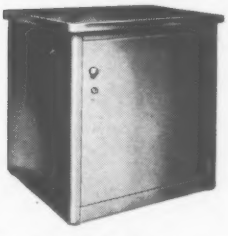
OFFICE CHAIRS



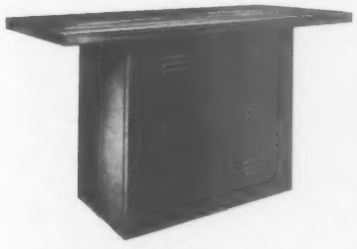
FLAT DRAWER FILES



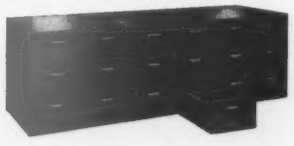
SORTING RACKS



OFFICE MACHINE CABINETS AND TABLES



WOODWORKING BENCHES

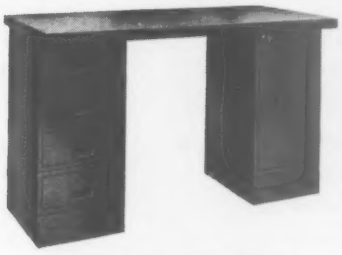


DRAWER CASE UNITS

WORK BENCHES

STEEL STOOLS

STEEL TOP BENCH WITH ACCESSORIES



MODULAR TYPE BENCHES

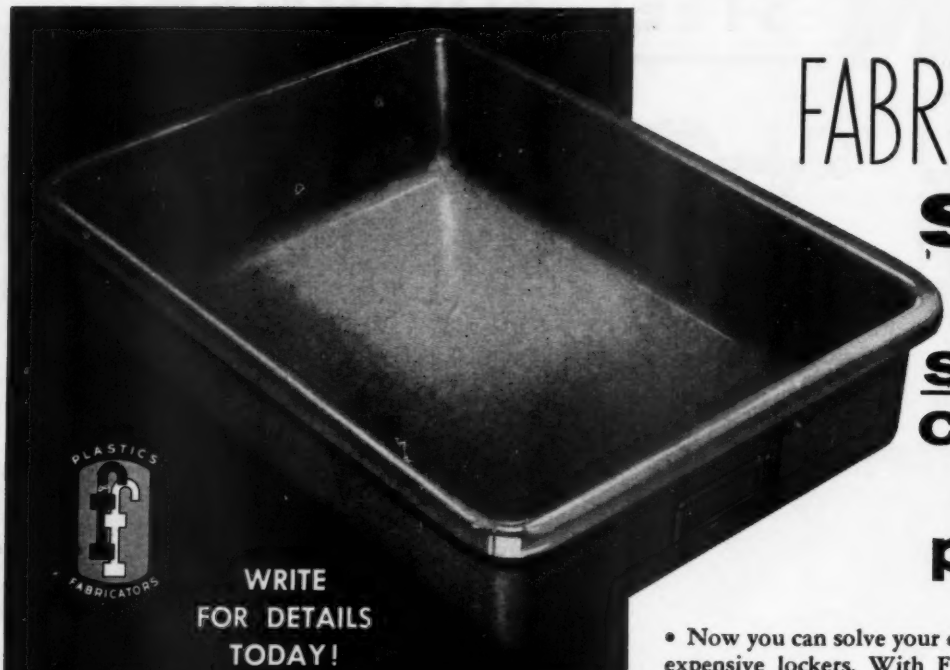
CABINET TYPE BENCHES

A PARTIAL LIST OF LYON PRODUCTS

- Storage Cabinets
- Filing Cabinets
- Flat Drawer Files
- Drawing Tables
- Sorting Files
- Coat Racks
- Folding Chairs
- Tables
- Desks
- Stools
- Tool Boxes
- Office Chairs
- Hopper Bins
- Parts Cases
- Drawer Units
- Work Benches
- Bench Drawers
- Cabinet Benches
- Hanging Cabinets
- Service Carts
- Tool Stands
- Bar Racks
- Shop Boxes
- Bin Units
- Revolving Bins
- Shelving
- Toolroom Equip.
- Lockers
- Economy Locker Rack
- Service Counters
- Slotted Angle
- Wood Working Benches

THE FABRI-FORM COMPANY

Byesville 2, Ohio



PLASTICS FABRICATORS

WRITE FOR DETAILS TODAY!

FABRI-FORM School Trays solve your classroom storage problems

Available from STOCK in these standard sizes

#T-100 8-7/8"x18-7/8"x4-5/16"	#T-103 11-1/2"x18"x4-1/4"
#T-101 13"x16-1/2"x3-3/8"	#T-104 14-3/4"x21"x4-1/8"
#T-102 13-5/8"x18-7/8"x4-5/16"	#T-105 13-5/8"x18-7/8"x3-1/2"

A typical Fabri-Form storage tray installation in use in an elementary school room.

• Now you can solve your classroom storage problems without expensive lockers. With Fabri-Form's new school trays, you have the ideal system for storing student's materials INDIVIDUALLY! Many schools use Fabri-Form school trays for storage in home economics, kindergarten, science and chemical labs, teacher's wardrobe cabinets, and manual training classrooms—to mention but a few of their countless uses. Typical of articles now being stored in these school trays are toys, art materials, blankets, "rest period" rugs, kitchen equipment, sewing equipment, books and writing materials, etc.

Fabri-Form school trays can be used without any additional equipment very satisfactorily—yet they are designed to fit any standard rack system the school may decide to add later. Your investment is economical and always protected, since these school trays HAVE IMMEDIATE USE TO SOLVE EXISTING PROBLEMS and are always available for later incorporation into a more elaborate storage system.

CHECK THESE FEATURES!

- **Beautiful pale tan, gray or green colors**
- **Made of sturdy high-impact plastic, with high gloss finish—UNBREAKABLE in normal use**
- **Resists soiling—easily cleaned with any mild soap**
- **Light weight and easy to handle—even by small children**
- **Sizes to fit most existing rack systems**
- **Used as original equipment by many leading school equipment manufacturers—NOW YOU CAN GET THEM INDIVIDUALLY**
- **Handy card holder on front, each child has his own easily identified school tray**
- **Over 864 cubic inches of storage space in school tray illustrated**
- **Low cost—long life—trouble-free storage**

MASTER LOCK COMPANY

Milwaukee 45, Wisconsin

Greatest improvement in locker security in years!

MASTER NO. 1630 BUILT-IN COMBINATION LOCK

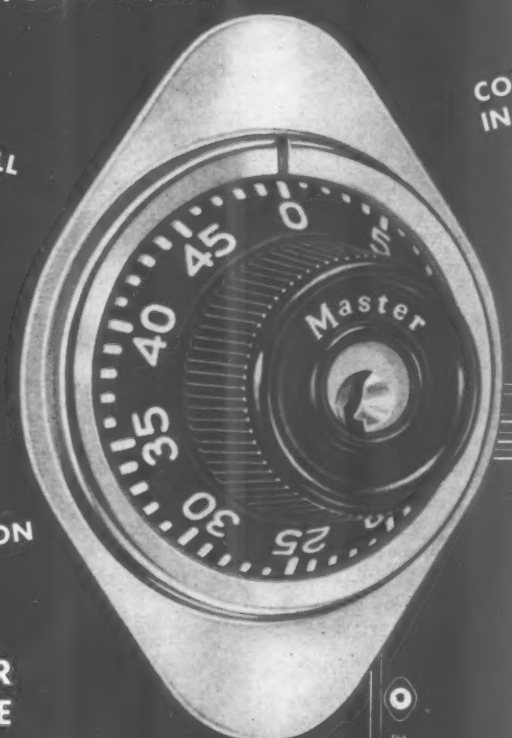
EASIEST TO INSTALL

TROUBLE-FREE OPERATION

REDUCES ADMINISTRATIVE TIME

EXCLUSIVE KEY-WAY — 5 PIN-TUMBLER PROTECTION

FULL 3 YEAR GUARANTEE



COMBINATION CHANGED IN FEW SECONDS

SAME KEY IS CONTROL AND RESET KEY

FINEST QUALITY — LOW COST

Master®

STANDARD OF SECURITY THROUGHOUT THE WORLD

School administrators, locker experts and maintenance supervisors enthusiastically praise MASTER's No. 1630 as America's finest built-in combination locker lock. In addition to highest quality and top performance, exclusive features of the No. 1630 sharply reduce the administrative problems of busy school executives. Write for a FREE brochure. No obligation.

MASTER GIVES YOU ALL THREE

No. 1500 COMBINATION PADLOCK
Same as No. 1525 but without key-control.

No. 1525 KEY-CONTROLLED PADLOCK
One school-owned control key opens every padlock.

No. 1630 BUILT-IN LOCK
Modern, advanced design described in detail above.

Master Lock Company, Milwaukee 45, Wis. • *World's Largest Padlock Manufacturers*

NATIONAL LOCK COMPANY

Rockford, Illinois

NATIONAL Combination LOCKS

dependable guardians of school lockers for 25 years

For complete locker protection at low cost . . . for simplified locker administration . . . choose NATIONAL Combination Locker Locks. Soundly-engineered for use on all styles of standard locker equipment, these quality locks assure the utmost in security, convenience, simplicity and durability. For trouble-free performance, select NATIONAL Locks.

No. 68-264

no. 68-264

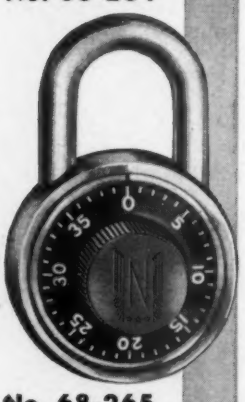
A high-quality, dependable combination shackle lock with Stainless Steel outer case. Dial is black enamel with white gradations. Lock has 5/16" dia. heavy-duty Chromium plated shackle. Requires three-number dialing to open. Thousands of different dialing combinations. Masterkeyed so it can be opened by authorized custodian.

no. 68-265

This outstanding shackle lock has many of the same excellent features as found in the No. 68-264. Shackle is 5/16" diameter. Lock must be dialed to three numbers to open. Dial is locked against rotation when shackle is open. This lock is not masterkeyed. Provided in plain zinc or bright Chromium finish. A dependable performer.

no. 68-259

Combination masterkeyed Laboratory Drawer or Door Lock. Combination can quickly be changed without removing lock from mortise. Lock is of solid Brass construction and is not affected by ordinary laboratory fumes and acids. Please specify right or left hand application when ordering this quality lock.



No. 68-265

no. 68-267

The working parts of this built-in lock have been completely redesigned to provide added strength and long trouble-free protection. For use on lockers with spring latch bar. Closing door drops latch and automatically locks lock. Escutcheon is satin Chromium plated. Master key is included with each initial order of 12 or more locks.

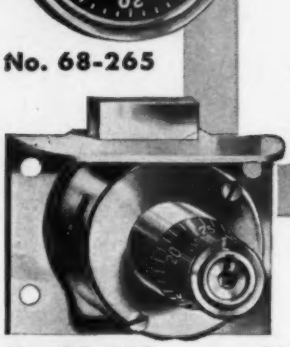
no. 68-269

This lock is designed for use on small lockers. Has beveled spring bolt lock. Bolt springs into locked position when door is closed. Strike plate is not necessary. Bolt drops into pierced door frame. 3-number dialing. Black enameled dial. 8 different combinations are available for each lock. Masterkeyed. Turning knob retracts bolt.

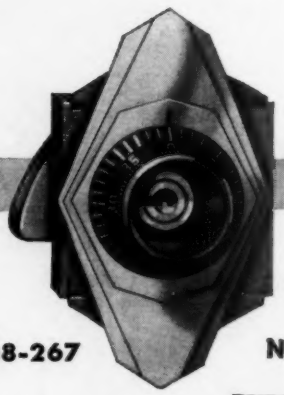
no. 68-271

This durable lock has the same outstanding characteristics as the No. 68-267, except it is not self-locking. Dead bolt is opened and locked manually by turning dial. May be applied to many lockers now in use. Masterkeyed. Ideal for either right or left hand applications. Provides long-term security.

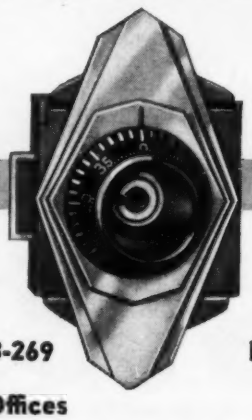
ask for illustrated folder showing complete line



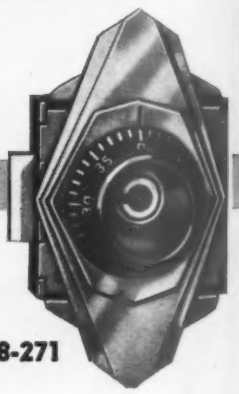
No. 68-259



No. 68-267



No. 68-269



No. 68-271

Branch Offices

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Columbus
Dallas
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Detroit
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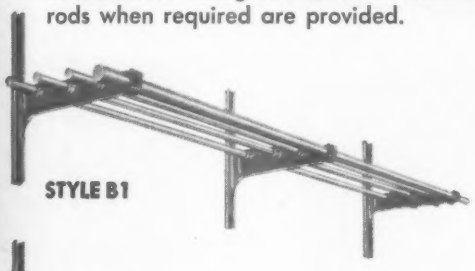
A. R. NELSON CO., INC.
38-35 Crescent St., Long Island City 1, N.Y.

ALUMINUM Coat and Hat Rack

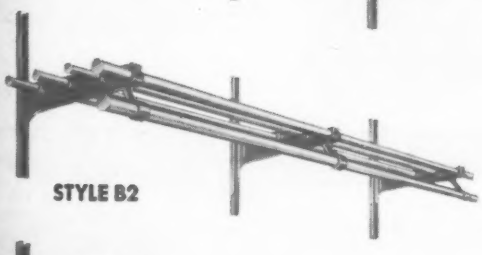
ANODIZED ALUMINUM

BRACKET TYPE

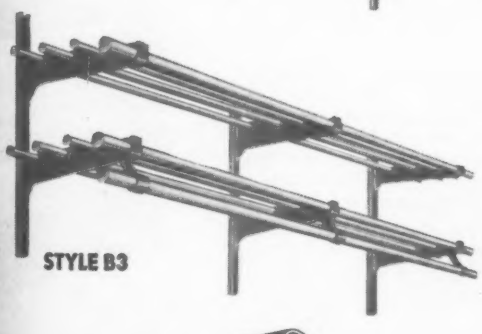
Brackets are die cast aluminum and when required, are adjustable in extruded uprights fastened to wall. Various shelf arrangements to fit in desired space. Front members and coat rods are 1" aluminum tubing. Three ½" intermediate stringers reinforced with steel rods when required are provided.



STYLE B1



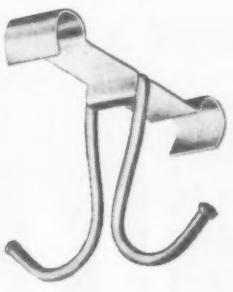
STYLE B2

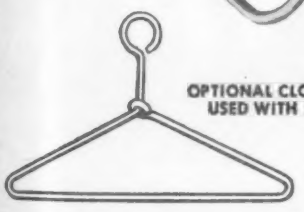


STYLE B3

"SNAP-ON" OR NON-REMOVABLE

WHEN OPTIONAL DOUBLE PRONG HOOKS ARE USED ON BRACKET OR STANDARD TYPES, THE THREE ½" INTERMEDIATE STRINGERS ARE REINFORCED WITH STEEL RODS





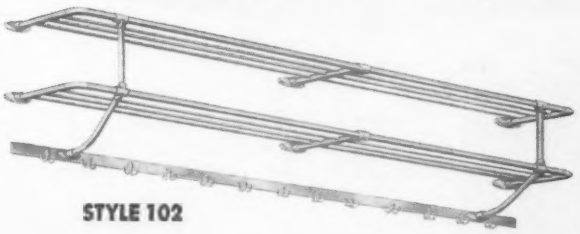
OPTIONAL CLOSED HOOK HANGER USED WITH COAT RODS

STANDARD TYPE

Racks are constructed of 1" aluminum tubular frame, intermediate supports and brackets, together with three ½" intermediate stringers reinforced with steel rods when required and drop forged fittings. Provides rugged construction to withstand much abuse . . . therefore widely used in schools.

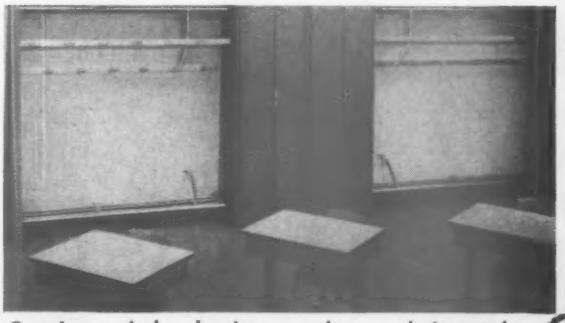
STYLE 100

COAT ROD FOR ALL STYLES



STYLE 102

HOOK STRIPS AVAILABLE SEPARATELY



Curtain wardrobe showing overshoe rack, inverted style 100 with horizontal braces not more than 2 feet

Custom Built by ARNCO

Write for brochures on above and for cubicle circular on dressing and patient room enclosures as shown in Sweet's Catalog.

HALE INDUSTRIES, INC.

Herkimer, New York

IDEAL FOR SCHOOLS... HALE Since 1907 WOOD BOOKCASES

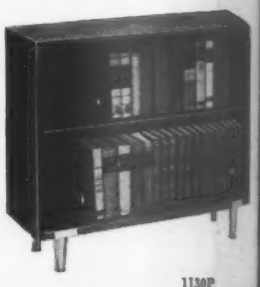
FOR BOARD ROOM, ADMINISTRATION, PRINCIPAL'S OFFICE

1148-W

The 1100 SERIES... Genuine walnut. Shelves adjustable, no overhanging edges (allowing end-to-end groupings). Available with or without sliding glass doors. Three base styles as illustrated.

36" wide, 11¾" deep, 30", 36" or 48" high.

1136NY



1130P

CLASSROOM, GUIDANCE AND GENERAL OFFICES...

4836

The 48 SERIES... in oak, walnut or birch. Shelves adjustable, built to last... practically indestructible.

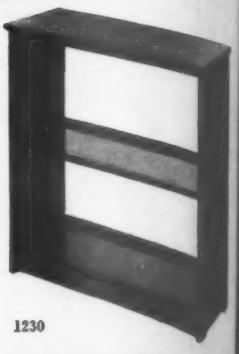
36" wide, 10¼" deep, 30", 36" or 48" high.

SCIENCE LABS, VOCATIONAL OR HEALTH ROOMS...

(or where inexpensive shelving is needed for supplies also)

The 1200 SERIES... of durable Adirondack birch in many finishes. Shipped unassembled all ready to set up. Ideal for tight budgets and a need for shelving. We also make special heights to your specifications.

29⅝" wide, 9⅝" deep, 30" or 42" high (12⅝" between fixed shelves)



1230

WHEREVER BOOKCASES ARE NEEDED

1006

THREE STYLES... of sectional (vertical stacking) bookcases with many models offering receding doors, sliding glass doors, wood doors, open cases, etc.

754

Send for Our Big Catalog Showing All Styles

FOR MORE INFORMATION,

contact your School Equipment Dealer or write us for our detailed catalog.

HALE

INDUSTRIES, INC.

HERKIMER, NEW YORK

F-1/Ba

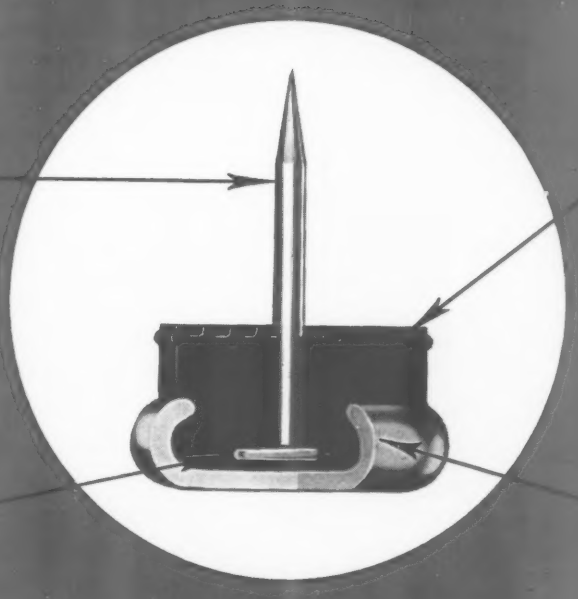
Bassick

GLIDES AND CASTERS FOR SCHOOLS

FOR

QUIETNESS
EASY ACTION
FLOOR PROTECTION

Every piece of School furniture needs RUBBER CUSHION GLIDES


DRIVE NAIL, . . . ATTACHMENTS AVAILABLE FOR ALL TYPES OF FURNITURE.
RESILIENT RUBBER CUSHION
SPECIAL LARGE NAIL HEAD . WHEN APPLIED DOES NOT CONTACT METAL BASE.
EXTRA HEAVY GAUGE FLAT STEEL BASE . . . FULLY HARDENED FOR LONG WEAR.

CATALOG NO. ASU-61

NAIL TYPE FOR WOOD

Constructed with a heavier gauge flat steel base having a greater degree of hardness than competitive glides, providing longer life and easier sliding qualities. A live rubber cushion affords complete cushioning and maximum quietness. NO METAL TO METAL CONTACT BETWEEN BASE AND NAIL WHEN APPLIED.

Recommended for use on chairs, tables and other pieces of furniture where protection of floors, easy sliding and elimination of noise is desirable. Ideal for use on hard surface floors (tile, concrete, terazzo, wood, etc.) and all composition floor coverings.

The sharp nail drives easily. When being applied to small legs or in hard wood, a slight lead hole will facilitate the installation.

SPECIFICATIONS

Base Diam.	Catalog Number Nickel Finish	Catalog Number Stainless Steel	Size recommendation — use the size with the largest diam. base the leg will accommodate, for greatest floor protection especially on linoleum, asphalt tile or other resilient floor coverings.	Carton Sets Per Box	Carton Weight Per Box	Boxed Sets	Gross Weight
7/8"	CG-90	CG-90S		6	3 lb.	120	13 lb.
1 1/16"	CG-91	CG-91S		6	4 lb.	108	20 lb.
1 1/4"	CG-92	—		6	5 lb.	72	15 lb.
1 1/2"	CG-93	—		3	3 lb.	36	13 lb.

SOCKET TYPE FOR WOOD

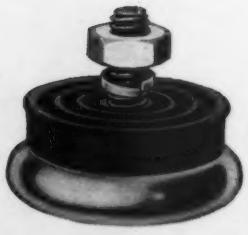
These glides are for use where chairs and other furniture have already been equipped with gripneck caster sockets. It is an easy matter to remove the caster and insert these quiet, easy sliding rubber cushion glides.

Constructed with a heavier gauge flat steel base having a greater degree of hardness than competitive glides, providing longer life and easier sliding qualities. A live rubber cushion affords complete cushioning and maximum quietness.

SPECIFICATIONS

Base Diam.	Catalog Number	Socket Data: Bore Diam.	Socket Data: Bore Depth	Socket Data: Standard Socket	Standard Finish	Carton Sets Per Box	Carton Weight Per Box	Boxed Sets	Gross Weight
1 1/4"	CG-391	3/8"	1 1/2"	No. 3 1" Track Plate	Nickel	1	7 oz.	25	12 lb.
1 1/2"	CG-393	3/8"	1 1/2"			1	9 oz.	25	15 lb.

MACHINE SCREW TYPE FOR METAL



SAME CONSTRUCTION AS NAIL TYPE SHOWN ABOVE EXCEPT WITH 8-32 MACHINE SCREW STEM PROJECTING 3/8" ABOVE RUBBER CUSHION.

FURNISHED STANDARD WITH NUT AND LOCK WASHER. WHERE THESE ARE NOT REQUIRED OMIT SUFFIX DESIGNATION X23 FROM CATALOG NO.

SPECIFICATIONS

Base Diam.	Catalog Number	Stem Data	Standard Finish	Standard Packing
7/8"	CG-290X23	8-32 Machine Screw With 3/8" Projection, Nut and Lock Washer	Nickel	Bulk
1 1/16"	CG-291X23			
1 1/4"	CG-292X23			
1 1/2"	CG-293X23			

FOR METAL TUBING WITH RUBBER EXPANDING ADAPTERS

The rubber expanding adapters are pliable enough to fit commercial variations of inside tubing diameters and are available in sizes to fit practically all of the popular sizes of tubing used on metal furniture. They provide a secure, simple, practical method of easy application. The tight fit of the rubber expander is an added noise and vibration reducer. They will not work loose under any normal operating conditions.

The adapter is expanded by turning the base of the glide by hand forcing the rubber adapter to bulge and fill the tubing, giving full length contact. The adapter can take all side shocks with no danger of bending or loosening.

Recommended for tables, stands, chairs and all metal furniture with tubular legs meeting the floor in a vertical position.

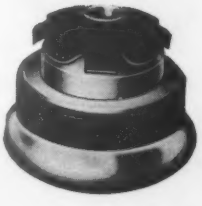
SPECIFICATIONS

Base Diam.	Catalog Numbers	For Outside Tubing Diameter		For Inside Tubing Diameter		Size Recommendation	Standard Finish	Weight Per Set	Standard Packing
		Nominal	Gauge	Nominal	Exact				
⅞"	CG-890 ⅝"	⅝"	18	11/32"	.521	Check Inside Diameter of Tubing to Determine Correct Glide for Application.	Nickel	3 oz.	Bulk
	CG-890 ¾"	¾"	18	15/32"	.652			3 oz.	
	CG-890 ⅞"	⅞"	18	17/32"	.777			3 oz.	
1 1/16"	CG-891 1"	1"	16	19/32"	.902			4 oz.	
	CG-891 1 1/16"	1 1/16"	18	21/32"	.96			4 oz.	
1¼"	CG-892 1¼"	1¼"	16	1 1/4"	1.12			6 oz.	

"UMBRELLA" TYPE FOR METAL TUBING

These glides are specially designed for institutional and school use on metal chairs and cannot be removed except with tools. The umbrella-shaped steel spring retainer surmounts a dome shaped spacer bushing. Any attempt at removal, except with mechanic's tools, causes the umbrella-shaped retainer spring to bite deeper into the metal of the chair leg.

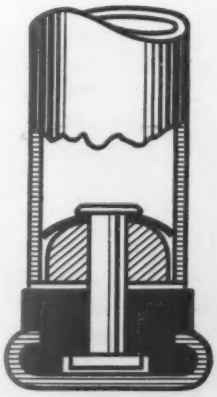
The design of Bassick rubber cushion glides prevents metal to metal contact between equipment leg and slide base thus eliminating noise and chatter when equipment is moved. SEE APPLICATION CUT-AWAY AT RIGHT.



SPECIFICATIONS

Base Diam.	Catalog Numbers	For Tubing		Standard Finish	Weight Per Set	Standard Packing
		Outside Diam.	Inside Diam.			
⅞"	CG-590 ⅞"	¾"	⅝"	Nickel	3¼ oz.	Bulk
*1 1/16"	CG-591 1" XLM	1"	.870"		5½ oz.	

*This size supplied standard with leg mount.



BASSICK CASTERS

The Bassick Company is the largest manufacturer of casters in the world. The items listed on this page are representative types often used in schools. Complete catalog data and recommendations for any specific installation will be gladly furnished on request.

CASTERS FOR SCHOOL PIANOS

PLATE AND SOCKET TYPES—DOUBLE WHEEL

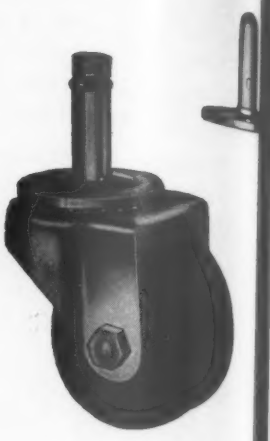
Low overall height, full floating ball bearing Diamond-Arrow casters specifically designed for easy movement of pianos in schools and protection to floors.

SPECIFICATIONS

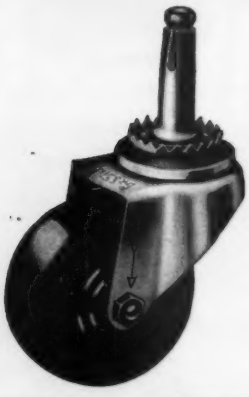
Wheel Diam.	Tread Width	Overall Height Stem Caster	Overall Height Plate Caster	Size of Top Plate	Bolt Hole Spacing	Size of Bolt Holes
2"	1⅝"	2⅝"	2 13/16"	2¾ x 3¾"	1¾ x 3"	11/32"

CATALOG NUMBERS

Wheel Diam.	Catalog Numbers	Type Caster	Type Wheel	Weight Per Set-lbs.
2"	2006x2-6(	Stem	Baco	3½
2"	[illegible]	Plate	Baco	4



CASTERS FOR CHAIRS



DIAMOND-ARROW

The largest selling quality office chair caster — because of economy combined with top quality. The patented two level full floating ball race construction provides maximum ease of swiveling. Wheels have self-lubricating bearings.

The "Baco" soft rubber tread wheel is recommended for school use.

Catalog Numbers	Wheel Diam.	Tread Width	Overall Height	Bore for Socket	Weight Per Set
8696	1¾"	¾"	2⅛"	⅜"	21 oz.
8695	2"	⅞"	2½"	⅜"	25 oz.

The casters listed are for wood chairs or furniture but can also be supplied with stems for all types of metal chairs.

CASTERS FOR DOLLIES AND TRUCKS

SERIES "68" *"DIAMOND-ARROW"*

The swivel truck casters listed below have the patented two level full-floating ball bearing construction which provides the utmost in easy action combined with economy. The numbers listed are supplied with the "Baco" soft rubber tread floor protecting wheels, self-lubricating bearings, and thread guards.

These are ideal for chair trucks and miscellaneous school service trucks. The Bassick Company manufactures various sizes and types of truck casters for every purpose. Complete catalog and information will be furnished on request.

SPECIFICATIONS

Wheel Diam.	Load Cap. Each	Catalog Numbers	Tread Width	Overall Height	Plate Size	Bolt Hole Spacing
2½"	80	2686-[illegible]	1⅛"	3 5/16"	2¾" x 3¾"	1¾" x 3"
3"	100	3686-[illegible]	1 5/16"	3 13/16"	2¾" x 3¾"	1¾" x 3"
4"	125	4686-[illegible]	1 5/16"	5 1/16"	3⅛" x 4⅛"	2⅜" x 3⅞"
5"	125	5686-[illegible]	1 5/16"	6 1/16"	3⅛" x 4⅛"	2⅜" x 3⅞"

F—1/Be

schoolco®

SOLID COLOR PLASTIC — PERMANENT BEAUTY

it's ***POSTURIZED***

STUDENT STUDY TOP COMBINATION

The Schoolco Model 781 is a particular favorite in classrooms from elementary thru college levels. It combines the advantages of separate desk and chair with the convenience of a single unit. Classic Schoolco functional design with permanent beauty in solid color plastic. Tops: grey; seats and backs: grey, green, coral, yellow, or mapletone. Frames: Sand Grey Enamel or Triple Plate Chrome. Strong, tapered tubular legs fitted with self-leveling, swivel-type, rubber cushioned steel glides. With book rack. 16", 18" seat hts.

Model 781—19x26" Top **Model 782**—18x24" Top

LIFT LID COMBINATION

Same as Model 781 but with one-piece book box. Continuous piano-type hinge. Two friction hinges hold top at any position. 13", 15", 16", 18" seat hts.

Model 791—19x26" Top

Model 792—18x24" Top

OPEN FRONT COMBINATION

Same as Schoolco Model 791 except book box has open end instead of lift top. Smooth, rolled edges prevent accidents. 13", 15", 16", 18" seat hts.

Model 771—19x26" Top

Model 772—18x24" Top

schoolco®

STYLING IMPROVES STUDENT'S MORALE

it's POSTURIZED

MASTER WORKMAN

Schoolco Model 874 designed to give newest ideas in work area organization and privacy. Extra heavy gauge tubing and panels throughout. Solid color grey plastic top is 18" x 32". Extra-large storage compartment furnished right or left as ordered. Swivel type rubber cushioned steel glides. Legs and book box sand grey enamel; modesty panel, coral enamel. 23, 25, 27 and 29 inch heights.

Model 874

THESE FUNCTIONAL COLORS SUSTAIN PUPIL'S INTEREST

MAPLETONE **YELLOW** **GREEN** **GREY** CORAL

Dynamic colors, scientifically selected, give proper variety and interest in any schoolroom decor. Finish is industry's most durable. Color goes clear thru solid plastic seats and backs for indestructible beauty. Schoolco seating enforces good, comfortable posture because it fits the natural contours of the body and promotes healthy attitudes. Free-standing chair frame has heavy gauge tubing throughout. . .strongest in service. Gracefully tapered legs with swivel-type, self-leveling, rubber cushioned steel glides.

Model 710
11"-12"-13"

14"-15"-

16"-17"-18"

schoolco®

it's ***POSTURIZED***

OPEN END DESK

Schoolco Model 721 open end desk is tops in versatility; with oversize 19x26" grey solid plastic top, it doubles as a desk or table and arranges in a variety of groupings for teaching flexibility. Super-strong, free-standing frame of extra gauge tubing throughout. Tapered legs mounted on self-leveling, swivel-type, rubber cushioned steel glides. Sand grey enamel book box. 21", 23", 25", 27", 29" high.

Model 721 Open End—19x26" Top

Model 722 Open End—18x24" Top

Model 731 Lift Lid—19x26" Top

Model 732 Lift Lid—18x24" Top

ADJUSTABLE LEGS

CLASSROOM TABLES

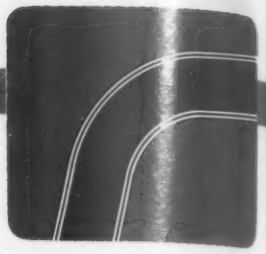
Schoolco Model 801 Tables are the perfect answer for single or group work areas in libraries, cafeterias, study halls, and classrooms. Table tops, in 14 shapes and sizes, have lightweight non-warping honeycomb core with high pressure laminated plastic surface. Heavy-gauge, tapered legs are ruggedly braced and adjust in low range from 20 to 26 in. or high range from 26 to 30 in. Grey top, sand grey enamel legs with chrome plated adjustable inserts.

Rectangular Tops: 24x48"; 30x48";
24x60"; 30x60"; 36x60"; 42x60"; 48x60"
Model 801 30x72"; 36x72"; 42x72"
Trapezoidal: 24x24x24x48"; 30x30x30x60"; Round: 48"; Half-round: 48"

schoolco®

DOUBLE STRENGTH AT STRESS POINTS

it's POSTURIZED



CHAIR DESK

The Schoolco Model 757 offers the finest value in moderately priced units for use in the upper grades through college. Trapezoidal worktop gives 17x21" work area. Generous underseat book rack. Combines the extra strength of Schoolco's 16-gauge X-frame leg construction with beauty of solid color plastic work top, seat and back and Schoolco's exclusive double strength desk arm, combining 12 gauge tubing with 16 gauge insert (illustrated upper right). Sand grey enamel or triple-plate chrome frame.

Model 757—Trapezoidal Top

Model 758—Contour Top

Model 759—Tablet Arm Chair

Model 757

Model 759

Model 758

schoolco, inc.
1900 North Narragansett Avenue
Chicago 39, Illinois

See your franchised dealer or write us for his name.

passes every test . . .

H-66 LL P

flexibility... design..

H-10 P

H-20 OF P

H-60 STBR P

The wide variety of furniture styles and versatility of their use assure complete satisfaction of your classroom needs . . .

HEYWOOD-WAKEFIELD
EST. 1826

Perfection made possible because Heywood-Wakefield combines 135 years of experience with modern techniques of design . . .

..function... value... econo

H-10 H-80 AD

H-10 H-90 TD

H-10

Close study of THE HEYWOOD LINE tells you: these are the most functionally-perfect units ever designed for schoolroom needs...

The quality that goes into every Heywood-Wakefield unit is unquestioned; no other line gives you more for your money...

Maintenance, repair, repl
bottom; THE HEYWOOD LI
mum money allocations.

economy!

Maintenance, repair, replacement costs are rock-bottom; THE HEYWOOD LINE can satisfy even minimum money allocations.

THE HEYWOOD LINE of school furniture for every need

Tested in thousands of classrooms . . . kindergarten to college . . . coast to coast

When you look through THE HEYWOOD LINE of school furniture, the advantages you look for quickly come to light. True comfort, beauty of color and design, functional perfection, rugged durability, flexibility that modern teaching methods require—all are there, ready to serve your needs, whatever they may be. And every desk, chair, combination unit, tablet arm unit, specialty piece—every model in THE HEYWOOD LINE—*has passed every test . . . at every level of learning.*

HeyWoodite and other durable materials reduce maintenance and replacement to a minimum

Featured in THE HEYWOOD LINE is the color-impregnated, solid plastic—HeyWoodite, a patented Heywood-Wakefield exclusive. This thoroughly tested material won't burn, break or stain . . . requires no maintenance, no refinishing, no repairs. Famous Heywood-Wakefield craftsmanship combines this virtually indestructible material—or plywood, solid wood or laminated plastic—with lifetime nickel-chrome-plated tubular steel . . . backs up superior construction with responsibility for installation and service. You choose from the nation's top-quality furniture, tested in the nation's schools . . . to meet *your* specific needs and *your* school's allowance for furniture expenditure.

HEYWOOD-WAKEFIELD

School Furniture Division

Menominee, Michigan

Gardner, Massachusetts

Newport, Tennessee

HEYWOOD-WAKEFIELD EST. 1826

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FIELD

comfort... durability..

H-30 TABS P

H-860

H-870

Chair seats, backs, and their relationship to each other, assure best posture; tablet arms are proportioned for proper writing pitch . . .

HEYWOOD-WAKEFIELD HW EST 1826

No other materials can outwear HeyWoodite and nickel-chrome finish; no other furniture can outlast Heywood-Wakefield . . .

auditorium seating
by HEYWOOD-WAKEFIELD

assures supreme comfort, easy maintenance, long life

Hundreds of school auditoriums and public assembly rooms attest to this truth: Heywood-Wakefield's auditorium seating line successfully meets every need. Fixed and movable units include chairs with veneer seats and backs, with spring or rubber cushions, with padded or spring-filled backs. You may select wood or steel end standards, manual or self-rising seats. Choose from an unusual range of fabrics, metal colors, and wood finishes. Like the auditorium line, Heywood-Wakefield's portable seating and folding chair lines offer you luxury and service that no other line can match.

TC-700

When you see and sit in any unit, you'll approve the thoroughgoing comfort, the beauty of color and design . . .

T-300

Chairs fold compactly with one simple motion, can be stored neatly, require a minimum of storage space.

See your Heywood-Wakefield representative, or write for catalog.

HEYWOOD-WAKEFIELD EST. 1826

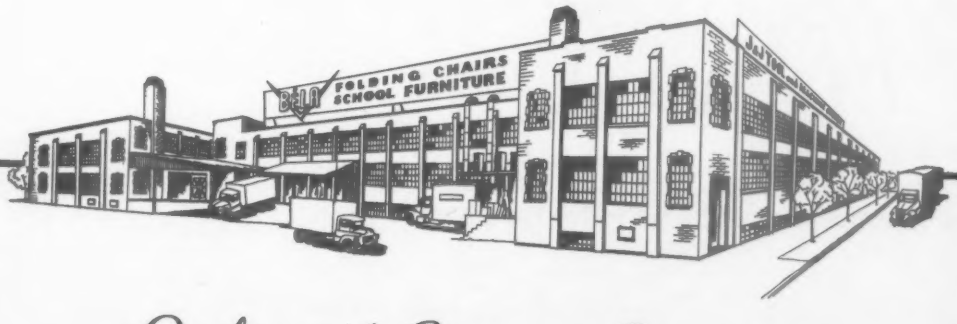
HEYWOOD-WAKEFIELD, SCHOOL FURNITURE DIVISION, MENOMINEE, MICHIGAN

BÉLA®

Always Say Bay-Lah

The Forward Look in Public Seating

School Furniture



Quality and Service — Since 1925

BÉLA® MODERN SCHOOL FURNITURE

Always Say Bay-Lah

Symbol of Quality Since 1925

NEW Accent on . . .

- Advanced Design
- Custom Quality
- Full Adjustability
- Maximum Economy

The Greatest Advance in School Furniture History!

- One desk for Kindergarten through College.
- Adjusts to fit any student.
- Eliminates size guesswork.

BÉLAIRE® SERIES SCHOOL FURNITURE

The remarkable new, patented **"BeLAIRE"** Adjustable Line, manufactured only by BeLA has been designed to fit ever changing school needs. Eliminates headaches and guesswork as to the correct size, and can be adjusted to fit individual student requirements. Minimize need for storing multiple size ranges and quantities of redundant furniture. The new BeLA "BeLaire Series" provides your finest value and best investment in school furniture.

ADJUSTABLE DESK, 21" - 30"

BeLAIRE Desk ADJUSTS TO ANY HEIGHT, from 21" to 30" (even ¼" adjustments!) serving Kindergarten through college. 40 DIFFERENT HEIGHTS PROVIDED BY ONE DESK! Simple **"ONE TURN"** adjustment is completely concealed and TAMPER PROOF! Double braced for fullest strength. Scuff proof plated pedestal base. Choice of eight colors. Mar-proof birch plastic tops. USE FOR ANY AGE GROUP, FROM 1st GRADE UP! Available with open or lift lid book box.

MATCHING ADJUSTABLE CHAIR

"ONE TURN" concealed adjustment is TAMPER PROOF! Two sizes: 13" - 16" and 16" - 19" adjustable to any desired height in ¼" increments. Contoured plywood seat and back. Self-leveling floor glides. Use with Belaire desk or as typing chair.

#575 CHAIR DESK

Seat Height 17" or 18". Modern Compound Curved Plywood Seat and Back. Underseat Book rack. Large plastic desk surface.

BeLAIRE NON-ADJUSTABLE CLASSROOM CHAIRS

Compound curved plywood seats and backs for correct posture and comfort. Available with underseat book rack. 8 seat heights. 11-18".

BÉLA® Always Say Bay-Lah

DESIGN AND OTHER PATENTS APPLIED FOR.

NATIONALLY ADVERTISED IN . . .
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ALL BeLA PRODUCTS ARE FULLY GUARANTEED

Division of J. and J. Tool and Machine Co., Chicago 28, Illinois

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BÉLA® MODERN SCHOOL FURNITURE

Symbol of Quality Since 1925

Always Say Bay-Lah

Accent on Economy

• Quality • Strength
• Comfort • Durability

CHALLENGER® SERIES

#D3 OPEN FRONT DESK
Ten Heights 21" to 30".
Desk Surface 18" x 24".
Plastic, Hardwood or Plywood.

#S1 CHAIR
Eight Heights 11" to 18"

#DST STUDY TOP DESK
Desk Surface 18x24. Hardwood or Plastic. With or Without Book Tray. Also Available with 20" x 26" Top.

DOUBLE DESK
18" x 48" Top for 2 Students.
Economy Priced Space Saving Unit!

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Desk Surface 18" x 24". Plywood or Plastic. Adjustable Friction Hinges.

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Hardwood Seat and Back
Sizes 11" to 18"
Underseat Shelf Available
#S3 Hardwood Seat, Plywood Back

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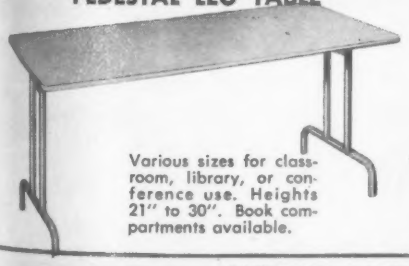
Sizes 11" to 18"
Plywood Seat and Back
Underseat Shelf Available.

Preferred and Specified by Educators • Architects • Administrators

BeLA School Furniture is designed and manufactured by expert craftsmen. Advanced "wall-saver", non-tip chair leg design. Exclusive BeLA features assure years of trouble-free service. Heavy gauge tubular frames, roomy book boxes, 100% superstrength bronze welded braces, all metal parts rust-proofed. Baked enamel chip proof finish in 7 colors. Super silent rubber cushioned glides on all units. Contoured plywood seats and backs or solid hardwood saddle seats. Mar-proof, natural birch finish plastic desk tops.

Wherever quality conscious, budget-minded superintendents, business managers or other school administrators are interested in economy, quality, and value, BeLA Furniture is specified and sets the standard for comparison. Constant research and development by the BeLA team of engineers under the direction of president B. B. Junkunc, a leading engineer holding 35 protective patents, is your assurance of the highest standards in modern school equipment. Quality and service since 1925 has made BeLA a world leader in low cost public seating.

PEDESTAL LEG TABLE



Various sizes for classroom, library, or conference use. Heights 21" to 30". Book compartments available.

TABLET ARM CHAIR

A favorite for high school or college classroom, lecture halls. Hardwood or plywood seats and backs. Underseat book rack as shown below, also available. 17" or 18" seat height.

#577 MODERN CHAIR DESK

For high school or college. Large plastic desk surface area. Convenient underseat book rack. Plywood seat and back. 17" or 18" seat heights.

MODERN TABLE

Modern 'tapered leg' table. Various sizes for multipurpose use. Book compartments available.

OVERSIZE DESK STYLE TABLET ARMCHAIR

Designed especially for high school or college classroom study use. With or without underrack. 17" or 18" seat height.

#STBB — COMBINATION STUDY DESK

Modern movabout unit. Full size top with side arm or 18" x 24" top. Plywood or solid hardwood seat and back. 17" or 18" seat heights.

BÉLA

Always Say Bay-Lah

"Non-Tip" Quality Folding Chairs
AMERICA'S FINEST MODERN PUBLIC SEATING

✓ Economy ✓ Quality ✓ Comfort ✓ Longevity ✓ Safety ✓ Durability ✓ Versatility

Institutions • Hospitals • Clubs • Schools • Churches • Hotels • Auditoriums

#6000 SCOTSMAN®
Economy All Steel Chair

#3000 CHALLENGER®
All Steel Chair

#1000 or #2000
All Steel Chair

#2002
Contoured Birch Plywood Seat

There is a BeLA Chair for Every Specific Seating Need . . . For Any Budget

#2001
Birch Plywood Seat

#2005
Maple Seat

#2003
Upholstered Seat

#2103
Upholstered Seat, Upholstered Back

#2104
Foam Cushion Seat, Upholstered Back

#2004
Foam Cushion Seat, Metal Back

All BeLA Chairs have Non-Tip Safety Design

#1103F
Deluxe Foam Cushion Seat, Upholstered Back

Choice of **25** Seat Styles!
Duran
Nylon
Mohair
Upholstery

#9173F "MIRACLE-FOLD"®
Tablet Arm with Independent Fold

Choice of **7** Baked Enamel Frame Colors
Chrome or Gold Bronze Plated

#2070
Tablet Arm Steel Seat. Plastic or Plywood Tablet. Choice of any seat style.

Designed Especially for Quality Conscious, Economy Minded Buyers

BeLA ACCESSORIES
- Underseat Folding Book or Hat Rack
- Hymnal Rack
- Kneeler

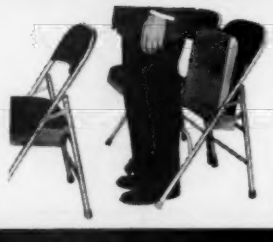
#5013
25 Coil Spring Cushion Seat

#5013RM
Armchair
Coil Spring Seat
Note: All BeLA chairs available with arms.

BeLA FOLDING KNEELER
Attaches to any BeLA chair. Folds between rear legs.

Before you buy . . . It will pay you to check BeLA Folding Chairs

#7013 SPRING CUSHION
Independent Folding Seat — Allows Easy ingress and egress.



ADVANCED DESIGN!
SAVE 30% FLOOR SPACE
All BeLA Folding Chairs are available with independent folding seats . . . increase seating capacity approximately 30%.
Patented.

#7013
Spring Cushion Seat folds independently of chair frame.

World's Greatest Selection of Quality Folding Chairs

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Specifications subject to change without notice.

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Division of J. and J. Tool and Machine Co., Chicago 28, Illinois

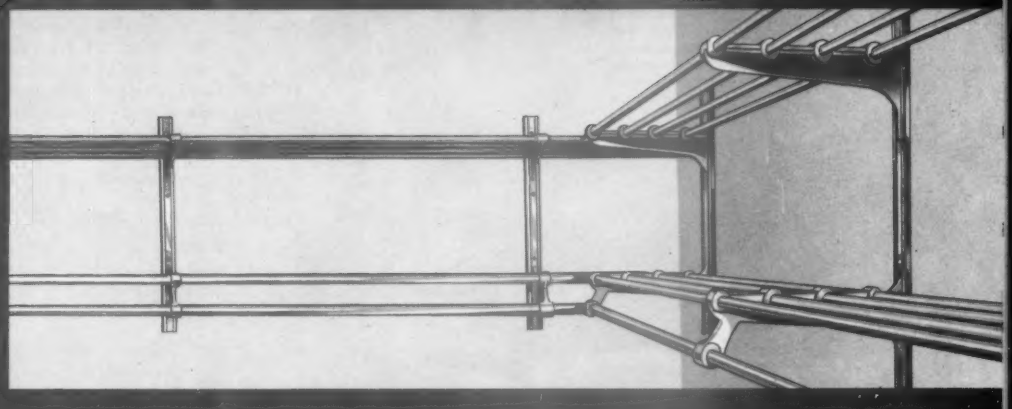
ALL BeLA PRODUCTS ARE FULLY GUARANTEED

F-4/Vo.

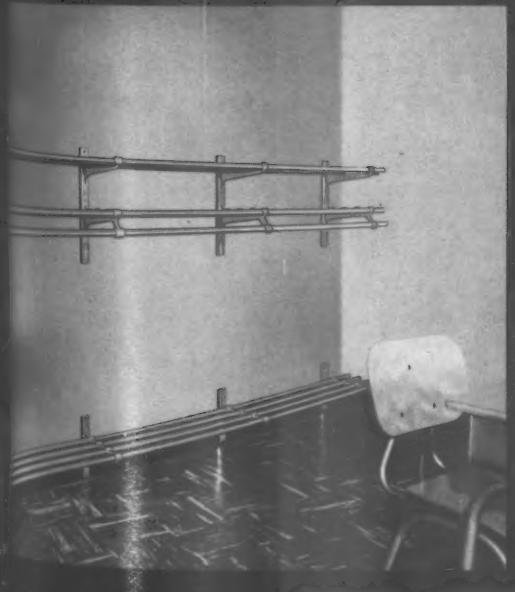
CUSTOM LINE

Aluminum

WALL MOUNT



COAT and HAT RACKS

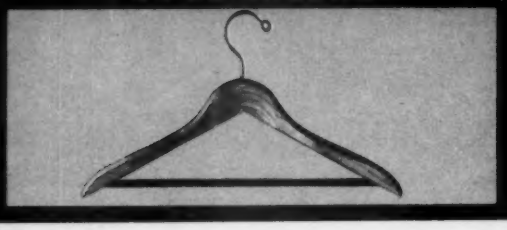


STYLED for SCHOOLS - INSTITUTIONS - MOTELS
HOTELS - RESTAURANTS - HOMES and wherever the need calls for CUSTOM QUALITY
UNITS are STRONG - RIGID - CORROSION RESISTANT
ANODIZED ALUMINUM - PERMANENTLY BEAUTIFUL
AVAILABLE IN SEVERAL color combinations and TAILORED TO FIT almost any specific application
QUICK and EASY TO INSTALL. They complement other furnishings and surroundings.

A.I.A. File No. 35-N-22

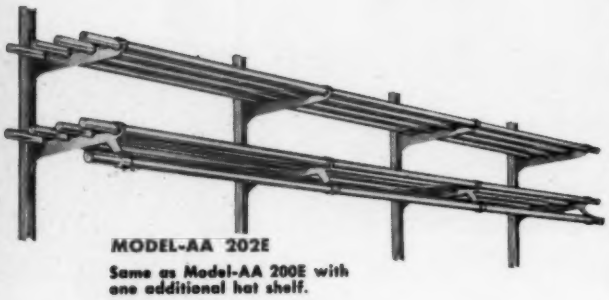
ADE ONLY BY **VOGEL-PETERSON COMPANY • ELMHURST, ILLINOIS**

Hanger Style RACKS



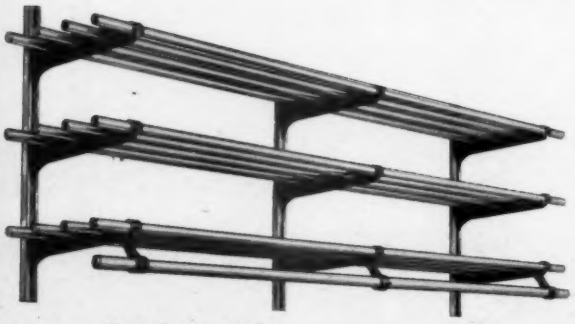
MODEL-AA 200E

Single shelf with hanger bar furnished in any length.



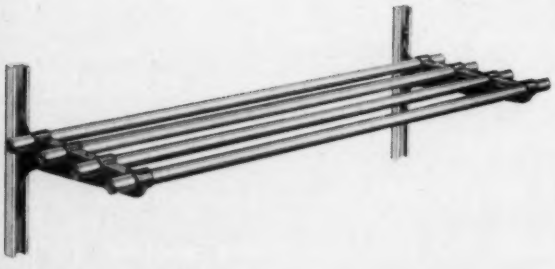
MODEL-AA 202E

Same as Model-AA 200E with one additional hat shelf.



MODEL-AA 203E

Same as models above with three shelves. All Custom-Line racks are tailored to any required length.



General Utility Shelf AA100E

Matching all-purpose shelf can be used as added hat shelf to increase capacity of other units. — as a general purpose shelf for closets or storage. Mounted 6" off floor makes an excellent boot and shoe shelf. In short lengths makes an ideal towel rack for Hotels, motels, institutions and homes.

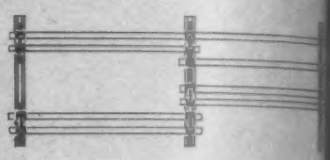
VOGEL-PETERSON

CUSTOM-LINE *Aluminum*

WALL MOUNT COAT and HAT RACKS

These beautifully styled anodized heavy duty aluminum wall mount units are what their name "Custom" implies. They are built to your exact length and multiple shelf requirements. Not only are these racks furnished to your exact length requirements, but they meet your exacting needs as to height from hook or hanger rail to the floor, as well as spacing between shelves. Easy spacing adjustment is made possible by our unique "T" extruded slide mounts detailed below.

TAILORED TO FIT...



models are furnished in any desired length to fit into recesses, between pilasters and in some cases can be worked across wall irregularities and obstructions. Are available in any combination of multiple shelf units or for two tier garment hanging requirements such as is sometimes needed for band and orchestra coats and jackets or blouses and shirts for home closets. These racks are adaptable to a wide variety of special applications.

Our heavy cast aluminum brackets are normally spaced on centers of from 27 to 38 inches, depending upon the length of the rack and specific usage.

Heavy cast double prong hooks come with Model 300 shelves and are keyed into reinforced grooved tubing to prevent rotating and are spaced on 2nd and 4th tubes to allow ample coat space. Where desired such as for clothes closets in homes, hotels, motels, etc., model 200 shelves can be supplied with hooks for the back tube. Hooks do not interfere with garment hangers.

The maximum number of staggered hooks between brackets on the 300 series is determined by the bracket spacing used. With the staggered hook arrangement this will average a little over 2½ hooks or 5 plus coats per foot.

COLORS

Aluminum Tubing and Extrusion Mountings—clear or gold deep etched non-peeling, non-corroding anodized finish.

Aluminum Die-Cast Brackets and Hooks—silver lustre, gold hammertone or black hard non-peeling, non-corroding finish.

Suggested Color Combinations

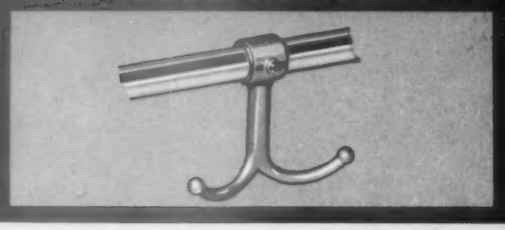
1. Clear anodized tubing with silver lustre brackets and hooks.
2. Gold anodized tubing with gold hammertone brackets and hooks.
3. Gold anodized tubing with black brackets and hooks.
4. Extrusion mountings should match the color of tubing selected.

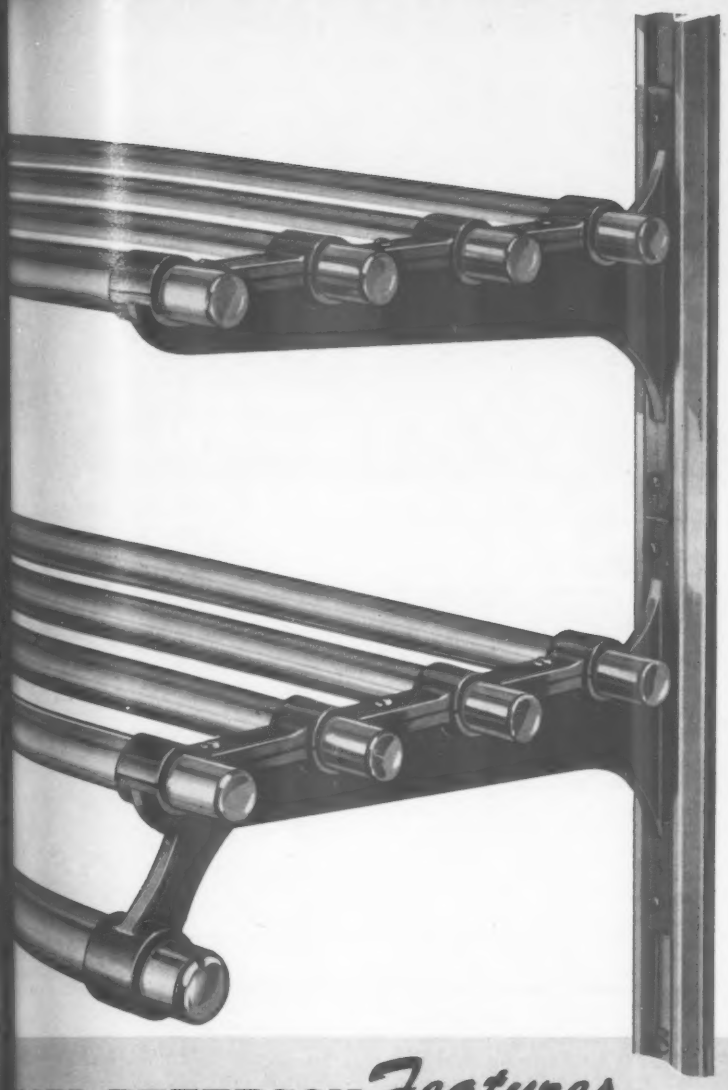
Architectural Specifications

Furnish and install adjustable Custom Line Model Number_____ (or as listed herewith) Coat and Hat Racks as indicated on plans. All racks shall be as manufactured and guaranteed by the Vogel-Peterson Company, Elmhurst, Illinois. Shelves shall consist of four ¾" O.D. .065" wall alum. tubes. Tubes that support hooks are reinforced with ⅞" x ¾" groove to prevent hook turning. Tube ends to be plugged with non-corrosive plastic buttons. Brackets shall be cast aluminum with matching caps of knurled inside surface to prevent tube movement. Brackets shall be held at the wall within aluminum extrusion mountings for vertical adjustment of Manufacturer's standard length and spacing. Hanger Rail (when specified) shall be 1" O.D. .065" wall aluminum tube. Double Prong Anchor Hooks (when specified) shall be in number as shown on plans and constructed of cast aluminum with non-turning inside key to engage ¾" tube. Hook strip (when specified) shall be extrusion mounted for adjustability with_____single prong alum. hooks per foot with adapters for horizontal adjustment. Hangers (when specified) shall be manufacturer's standard type_____ spaced_____ per linear foot of rack. Finish shall be (clear-gold) deep etched anodized for tubing and extrusions and (silver lustre-gold hammertone-black) baked enamel for brackets and hooks.

Write us on any special application that you may have.

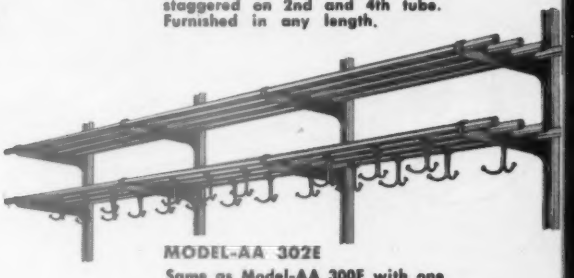
Hook Style RACKS F-4/Vo.





MODEL-AA 300E

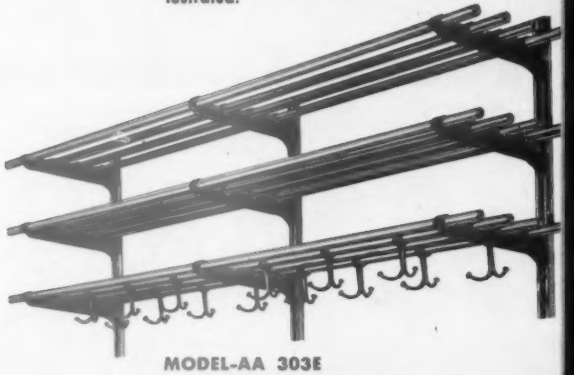
Single shelf unit with double anchor style aluminum coat hooks staggered on 2nd and 4th tube. Furnished in any length.



MODEL-AA 302E

Same as Model-AA 300E with one additional hat shelf.

For appearance and for easier access to hooks, we suggest the staggered hook arrangements illustrated.



MODEL-AA 303E

Same as models above with three shelves.

All Custom-Line racks are tailored to any required length.

OGEL-PETERSON *Features...*

TRUSION "E" MOUNTS

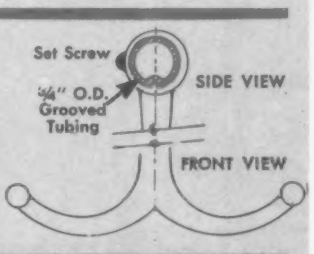
Anodized Aluminum extrusion mountings are furnished with all Custom-Line racks. The use of extruded mountings with our racks provides the following advantages.

1. Added beauty in multiple shelf units.
2. Ease of adjustment where racks are to be used for growing children and alternate use between children and adults.
3. Perfect alignment of multiple shelf units.
4. Add strength to cast brackets and for firmer wall anchoring.
5. Extrusions available up to 84" in length.

Brackets are held firmly in extrusion mountings but can be readily adjusted vertically to meet any height requirement such as in elementary schools.

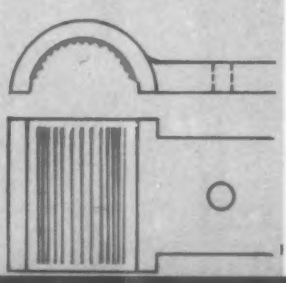
ed Self-Aligning Hooks

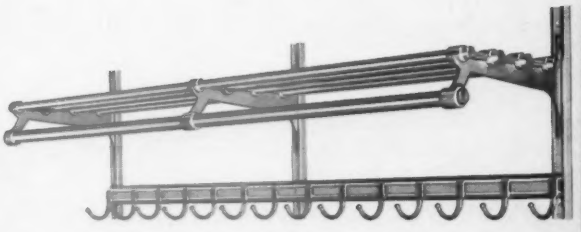
Custom-Line double prong anchor hooks are keyed solidly and fit into specially designed reinforced grooved ¾" heavy wall anodized tubes. They cannot rotate on tube—are always evenly aligned. Set screws keep hooks correctly spaced on predetermined centers.



rled Holding Cap

To keep tubing secure in wall brackets and to prevent tubes from rotating—the cap covers are notched as illustrated. This feature assures a solid fit and keeps coat hooks in correct vertical position.





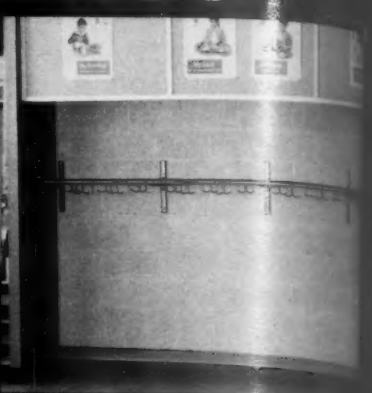
MODEL-AA 200E with EX HOOK STRIP and SPHA Hooks

Combination hanger type rack with additional hook strip mounted on vertical mounts provides an adjustable vertical height to accommodate any age group.

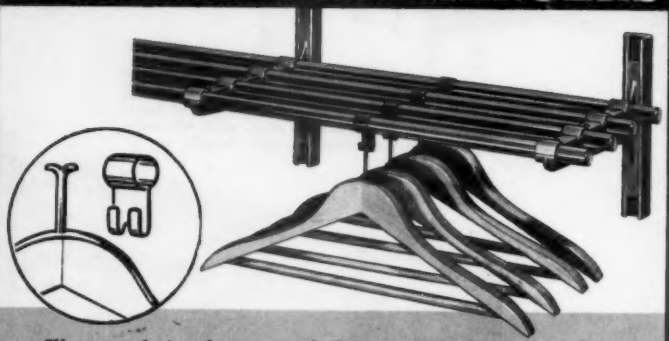
UTILITY EX HOOK STRIP and SPHA HOOKS

Where shelf storage over hooks is not required, Ex hook strip and SPHA hooks attach directly to wall or cabinet, the large cast hooks are adjustable left or right so any desired centers or quantities of hooks can be provided.

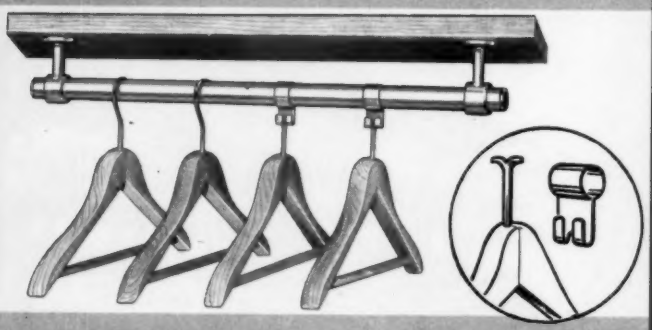
TYPICAL INSTALLATIONS



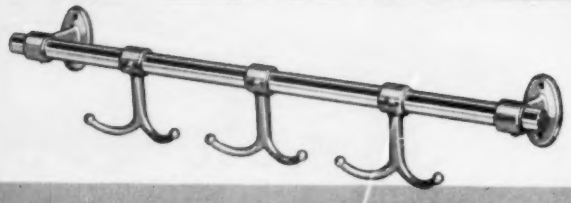
CLOSET ACCESSORIES AND GARMENT HANGERS



Illustrated is the use of Y75 receptacles and Y18P. (Parallel to Wall) garment hangers on AA100E Utility Shelf. This arrangement ideal for shallow closets or where hangers should not extend beyond face of hat shelf. For added groups of 4 garment hangers receptacles are spaced approx. 24" O.C. 316 BT 15 and 17 plated steel hangers can also be used with Y75 receptacles.

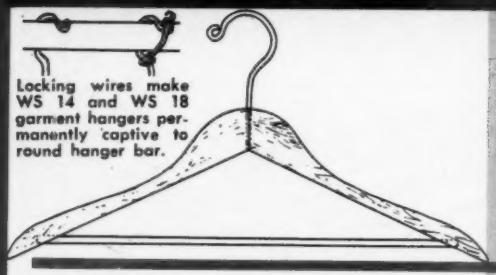


CL-100 BR — Under shelf brackets with 1" O.D. anodized aluminum tubing comes in any length required with brackets properly spaced to assure maximum rigidity. Illustrated with 2 WS18 conventional hangers (left) and 2 Y18X special hangers with Y receptacles (right). Y style hangers can be used only with Y receptacles reducing hanger loss to minimum. 316 BT 15 and 17 plated steel hangers can also be used with Y100 receptacles.



CL-75 BR-Wall style brackets with ¾" O.D. Anodized Aluminum tubing are furnished any length with sufficient number of brackets for maximum support. Illustrated as wall hook strip using Anchor Type Cast Aluminum hooks. Illustrated below CL-75 BR utility rod can be used as towel bar — hand rail, etc.

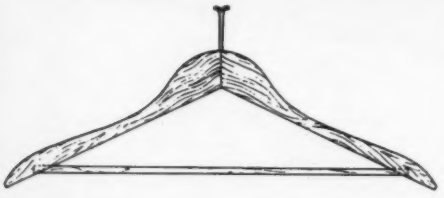
HANGERS



Locking wires make WS 14 and WS 18 garment hangers permanently captive to round hanger bar.

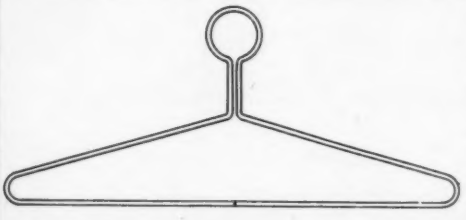
WS 14 — 14" Childrens
WS 18 — 18" — Larg size

Both sizes are de luxe wood hangers with varnish finish and heavy hooks. When wanted (nonremoveable) locking as WS 14W or WS 18W.



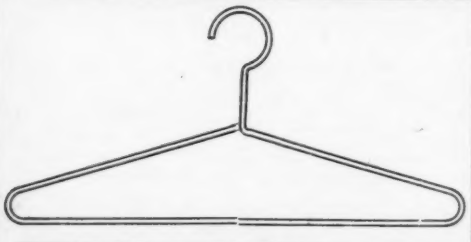
Y 18P
Y 18X

Both de luxe 18" hard nished hangers with hook to fit Y receptacles. Y 18P for parallel to wall Y 18X for standard right wall hanging.



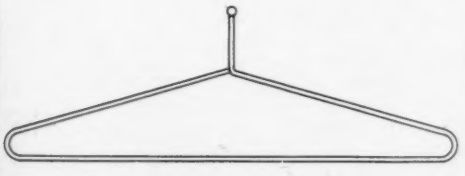
316 CL 15—15" childrens
316 CL 17—17" adult si

These 3/16" heavily pla hangers made for captive manent arrangement ov hanger rods.



316 OH 17

This style furnished only in size. Also made of 3/16" ha wire.



316 BT 15—15" childre
316 BT 17—17" adult s

These 3/16" heavily pla hangers made with ball either Y75 or Y100 recep

Y75 Receptacle is us over ¾" O.D. tubing. Y100 Receptacle us over 1" O.D. tubing.

For both Y75 and Y100 choice of the following ha be used: Y 18P and X 1 316 BT 15 and 17 wire of fitting and hanger mended to discourage t hangers to be used else

Elementary School
d, Michigan

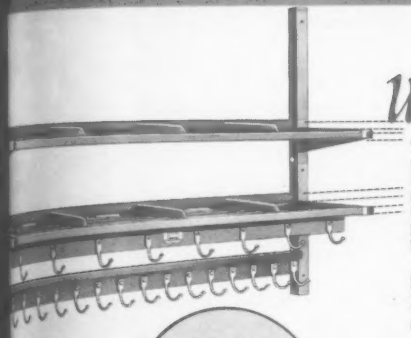
George D. Mason, Architect
Wm. Shunck, School Supt.

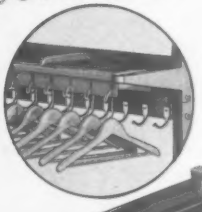
Minnewashta Elementary School
Excelsior, Minnesota

Thorshov & Cerny,
Minneapolis, Architect
Wm. O. Nilsen, School Supt.

VOGEL-PETERSON CO.

Schooline® Wallmounts – COAT, HAT and OVERSHOE RACKS



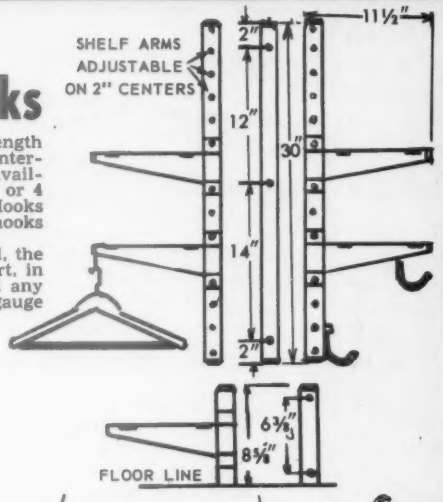


Adjustable Wallmount* Wardrobe Racks

These efficient coat and hat racks come in 3'-2" and 4'-2" length units which mount directly on any wall, independently or interlocked to make continuous racks of any length—fit in any available space. They have large capacity. AWHR Models hold 3 or 4 Coat Hangers per running foot—AWHK Models hold 5 or 6 Hooks per running foot. Specify desired capacity of hangers or hooks per foot.

With supporting columns permanently attached to the wall, the shelves are adjustable for height from floor, or distance apart, in 2" steps over a 30" range. Hench shelves can be adjusted at any time to serve any age group. Strongly welded of heavy gauge steel they will stand up under years of hard use.

AW3HR (HANGER STYLE) — 3'-2" long.
AW3HK (HOOK STYLE) — 3'-2" long.
AW4HR (HANGER STYLE) — 4'-2" long.
AW4HK (HOOK STYLE) — 4'-2" long.



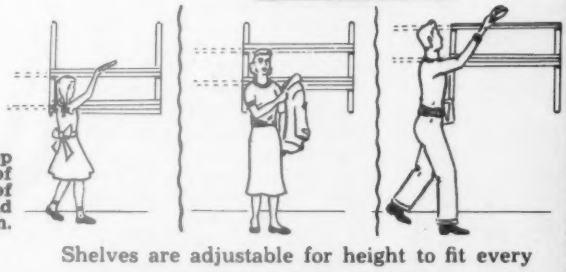
Wallmount* Overshoe Racks

Designed for use in combination with Wallmount Wardrobe Racks.

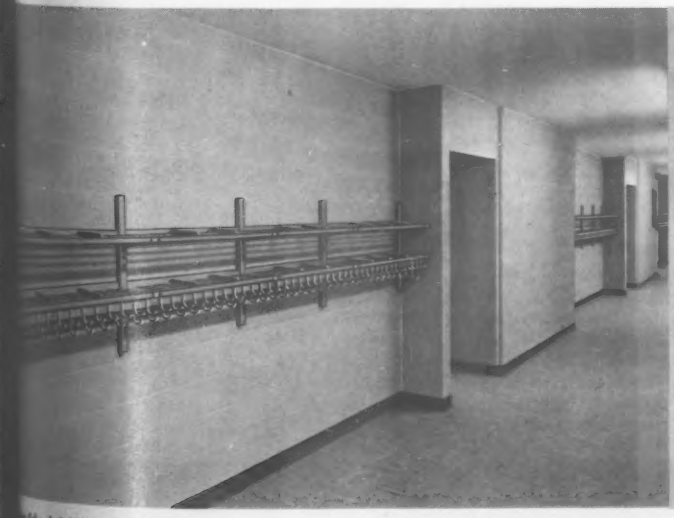
Easily mounted on any available wall these sturdy racks keep overshoes etc., off the floor, in a safe orderly manner. Built of heavy gauge, welded steel U-forms they are strong, fire proof and vermin proof. They are so designed that basic 3'2" and 4'2" units can interlock to make a continuous rack of any length.

No. B-3 Wallmount Overshoe Rack is 3'2" long.
No. B-4 Wallmount Overshoe Rack is 4'2" long.

U. S. Patent Applied for
* VOGEL-PETERSON TRADE MARK

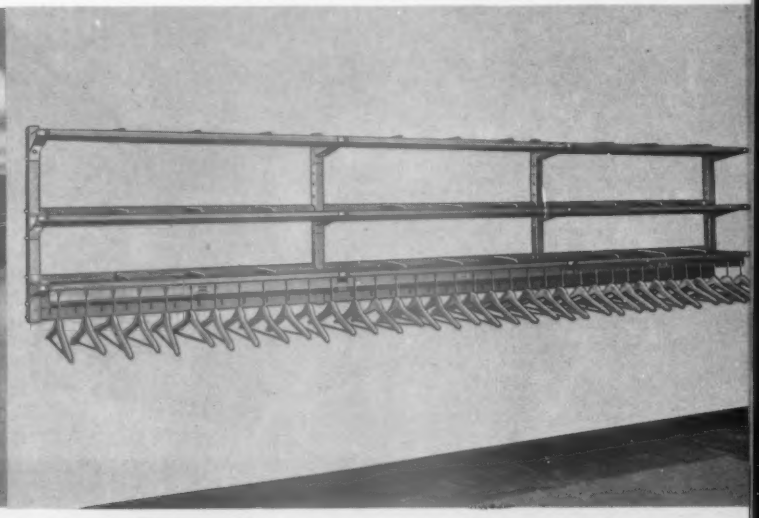


Shelves are adjustable for height to fit every age group without detaching from wall.



School Addition
City, Michigan

Walter T. Anicka, Architect
Edwin O'Leary, School Supt.



Eastgate Elementary School
Bellevue, Washington

Naramore, Bain, Brady
& Johanson, Seattle,
Architects
George V. Brain, School Supt.

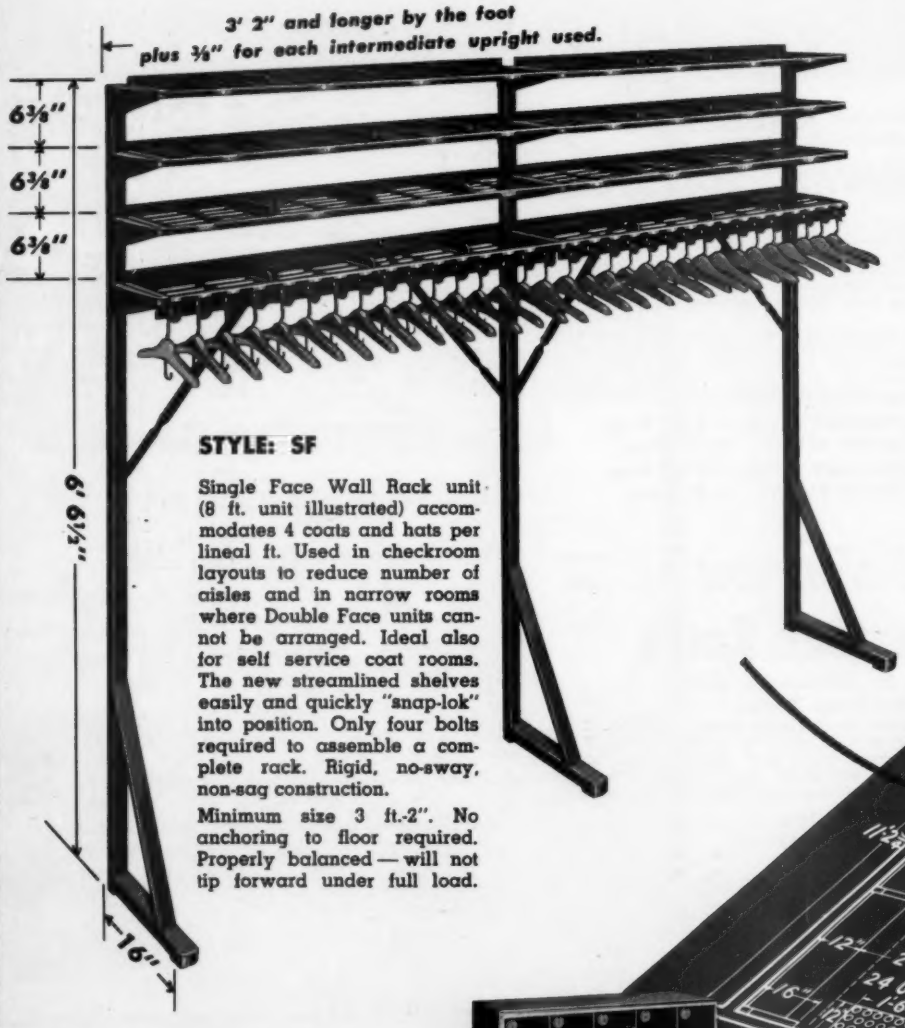
Checker®

Trade-Mark Registered—U. S. Pat. Off.

COAT and HAT RACKS

Vogel-Peterson checkroom equipment is the finest available, correctly designed and unequalled in quality. It is constructed of electrically welded heavy gauge steel, with square tubular posts. Available in standard units 3, 4 and 5 ft. long that interlock to make any length.

Vogel-Peterson High Relief, "Dust Free" Hat Shelves. These shelves are perforated and multiple embossed with narrow longitudinal ribs that keep hats clean and dry. This durable, modern shelving is built for lifetime service. The hanger rail shelves will support at least 100 lbs. per running foot.



STYLE: SF

Single Face Wall Rack unit (8 ft. unit illustrated) accommodates 4 coats and hats per lineal ft. Used in checkroom layouts to reduce number of aisles and in narrow rooms where Double Face units cannot be arranged. Ideal also for self service coat rooms. The new streamlined shelves easily and quickly "snap-lok" into position. Only four bolts required to assemble a complete rack. Rigid, no-sway, non-sag construction.

Minimum size 3 ft.-2". No anchoring to floor required. Properly balanced — will not tip forward under full load.

Planning an Efficient Checkroom

Recommended factor ¾ sq. ft. per hanger capacity. This will permit a complete checking service for coats and hats — umbrella and overshoe requirements.

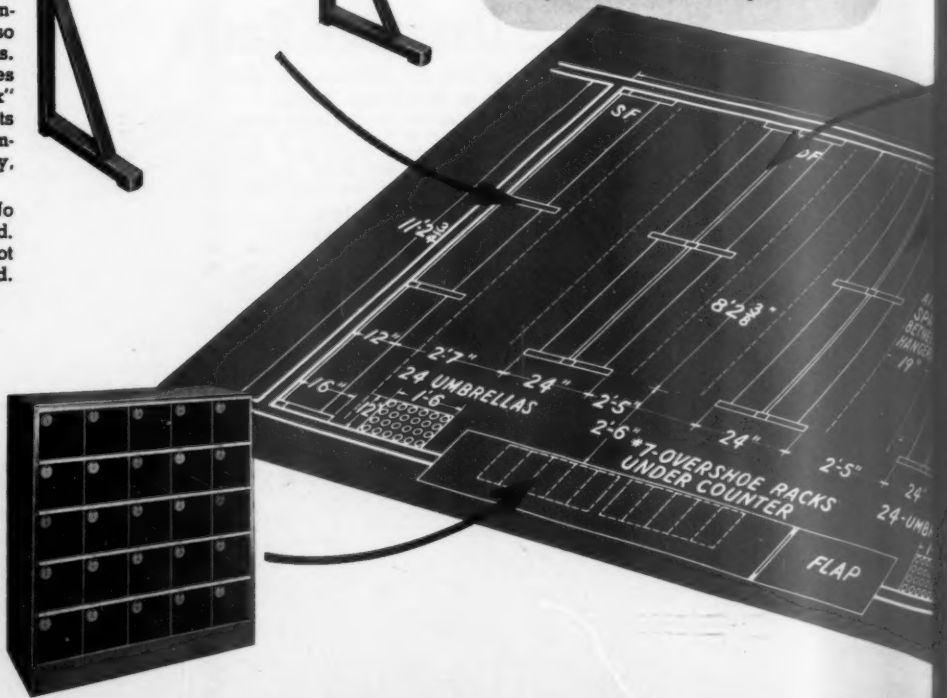
Minimum ceiling height—7 ft.

Standard spacing of coat hangers is on 3" centers (4 to the lineal ft.). Capacity can be increased 25% by spacing hangers 2½" on center (5 to the ft.). Layout service is offered to architects and building owners without charge.

Send

1. Floor Plan (indicate door and window openings, radiators, pipes, etc.)
2. Capacity to be accommodated
3. Type of installation—permanent, portable or combination of permanent and portable.

Avail yourself of our 30 years' experience and practical knowledge of checkroom requirements.



OVERSHOE RACK NO. OS-7

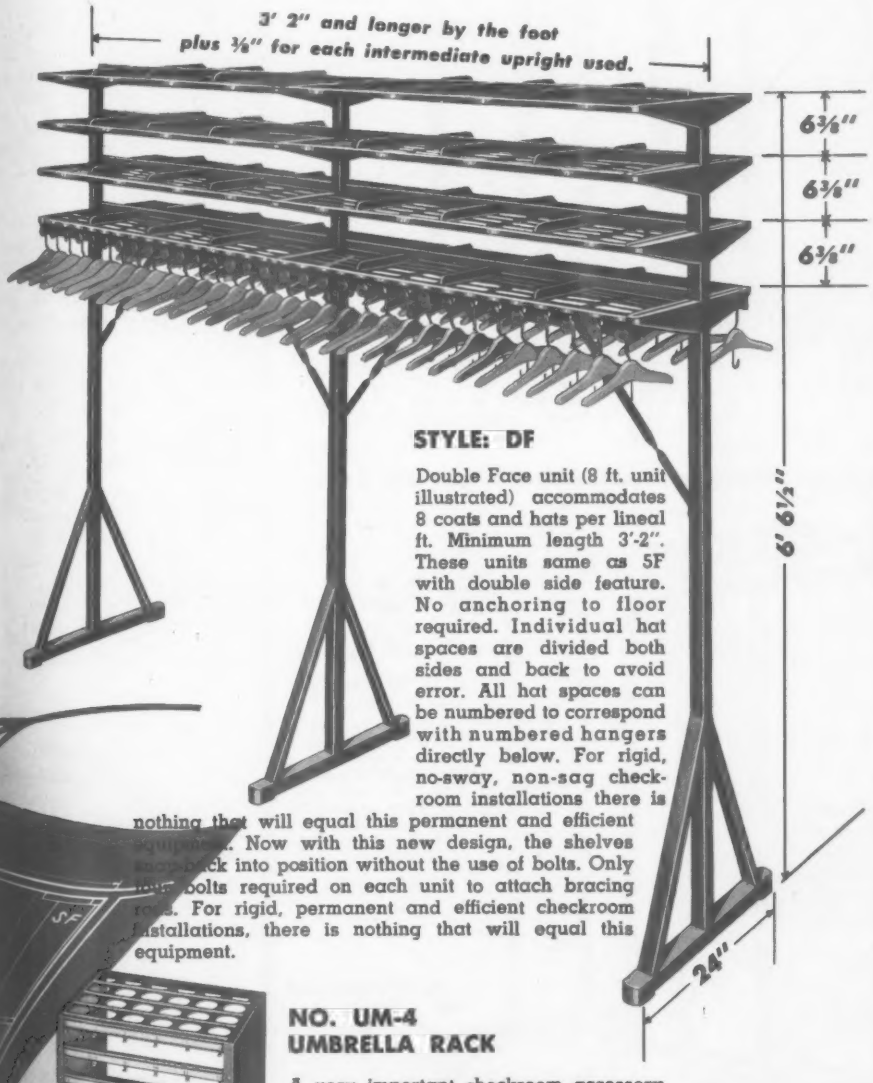
A checkroom necessity in climates where rubbers and galoshes are used. Approximately 20% of the total hanger capacity is usually a sufficient amount. Compartments measure 6" x 6" x 13" deep. These units become an integral part of the 1-check system when used with checkroom coat and hat racks. Furnished in standard size units of 25 capacity 31" wide, 13⅜" deep x 33" high.

For over 30 years specified by leadi

F-4/Vo.

SPEED UP CHECKING SERVICE WITH THE *One-Check System*

With this system a single check identifies all items checked, whether it be one or several. Each coat on a numbered hanger space—each hat in a correspondingly numbered hat space. Canes, umbrellas and overshoes are placed in systematically numbered umbrella or overshoe racks. Cross checks from overshoe and umbrella racks may differ—still are immediately keyed to master guest check. There is no lost time, no errors, confusion, delays nor complaints, because guests need carry only one check, which ends necessity of multiple handling by attendants.



STYLE: DF

Double Face unit (8 ft. unit illustrated) accommodates 8 coats and hats per lineal ft. Minimum length 3'-2". These units same as 5F with double side feature. No anchoring to floor required. Individual hat spaces are divided both sides and back to avoid error. All hat spaces can be numbered to correspond with numbered hangers directly below. For rigid, no-sway, non-sag checkroom installations there is nothing that will equal this permanent and efficient equipment. Now with this new design, the shelves snap back into position without the use of bolts. Only [illegible] bolts required on each unit to attach bracing rods. For rigid, permanent and efficient checkroom installations, there is nothing that will equal this equipment.

NO. UM-4 UMBRELLA RACK

A very important checkroom accessory which answers the "what to do with wet umbrellas" question. Racks are systematically numbered. Round umbrella dividers are hemmed to give a smooth no-tear edge. Come in standard units of 16 and 24 capacity sizes. Height, 28"; depth, 13"; width, 16 capacity, 12¼"; width, 24 capacity, 17¾". These units also an integral part of "One-check system." Approximately 20% of hanger capacity meet overall requirements.

Specifications and Construction Details

UPRIGHT FRAME

Welded into one rigid unit. Posts 1½" x 1½" x 18-gauge welded square tubing. Shelf arms—tapered U-channel 20-gauge punched out to engage 1½" sq. post and welded thereto. Arms are reinforced with inserted U-Channel—ends capped with round formed stamping. Hat shelves engage into slots in arms by means of integral self-locking clips.

Bases #16 gauge 1⅝" wide x 1¼" high and punched out to engage post and welded thereto. Box inserts raise base member at extreme end ¼" from floor. Base ends are capped with round formed stamping welded into ends. Diagonal brace of one-piece channel #18 gauge welded post to base.

SHELVES

One-piece design perforated and embossed sheets of 24-gauge steel welded into rigid channel angle and T frame.

Front channel $\frac{5}{16}$" x $1\frac{1}{8}$" x $\frac{5}{16}$" x 16 gauge.

Back Angle 1" x ½" x 16 gauge.

Ends are T-shaped 1¼" x ¾" x 16 gauge with two self-locking clips welded under each end.

Narrow longitudinal embossed ribs between perforations hold hats free of dust. Hat dividers embossed 1" high across shelves 12" on center.

Hanger rail is 1¾" flange extension of front channel of lower shelf only. Bottom of flange is hemmed to give smooth edge and reinforce V-punched notches that receive garment hangers. V-punched notches are on pre-determined centers.

Sway Braces—$\frac{5}{16}$" x ¾" round edge steel.

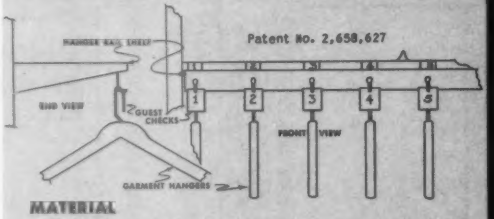
GARMENT HANGERS

Hardwood hangers. No. 10 hard steel rustless wire hook formed to receive guest checks on top (locks hanger on rail preventing knocking off accidentally) and with auxiliary hook beneath shoe bags, umbrellas, etc.

NUMBERING AND CHECKS

Hanger and hat spaces numbered with large clear cut white numerals hot-stamped into clear extruded plastic clips that snap over front shelf channels—furnished only if specified.

Plastic checks 1½" x $1\frac{11}{16}$" with large clear hot-stamped numbers. Furnished only if specified. Checks furnished in three colors—Black—Gray—Red. Printed with name of user when specified.



MATERIAL

Cold-rolled smooth surface furniture-grade steel used throughout.

WELDING

All welding by automatically timed welders assuring positive fusion of materials.

FINISH

Steel is washed and rust-proof coated before application of enamel. Enamel is baked-on at 350°. Baking time thirty minutes.

Standard colors—V. P. Brown—Gray or Green.

CAPACITY

Standard spacing of hangers is 3" o.c. or four to the foot. Can be furnished on 2½" o.c.—five to the foot — or 4" o.c. — three to the foot — when specified.

CASTERS

3-inch Ball-bearing Swivel Casters.

Furnished only when specified. It is not recommended that casters be used on racks exceeding ten feet in length.

All racks ordered with casters are furnished with bottom bracing and gussets extending between base sections of uprights. (See Page 1.)

NOTE: Wall-mounted units are same construction as shelf portion of rack SF with holes punched through tubing for wall mounting. Screws — toggles or expansion bolts for wall fastening are not furnished.

SPECIAL: All units can be ordered with special spacing between shelving or with fewer than four shelves, which is standard.

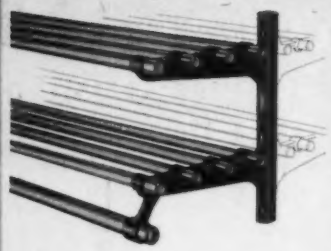


Illustration shows hanger rail for garment hangers on Model VP 200. VP 120 same with one shelf for hats.

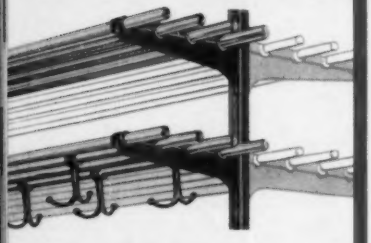
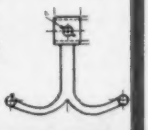


Illustration showing staggered hooks on Models VP 300 2 shelf rack. VP 130 same with one shelf for hats.

HOOKS

Double Anchor Type Cast Aluminum coat hook. Designed for durability, capacity and smart appearance. Used on alternate rails. 36 hooks are staggered giving 72 coats capacity on Model VP 300 and Model VP 130.



Model VP 300, illustrated
Model VP 130, same with one shelf.

Complete with 36 staggered double prong coat hooks (capacity 72 coats)

Veep

Quick Folding PORTABLE Coat and Hat Rack

Here is the complete answer to ever changing wraps problems. folding coat and hat racks to wherever needed on large 4" tired casters . . . pass through nary doorways, ride ordinary tors as readily as a servi Engineered and self-balan cleverly that they unfold eas one movement into a big e rigid wardrobe rack.

Strongly built bases of plated tubular steel support wide ha ves of smart closed end a aluminum tubing.

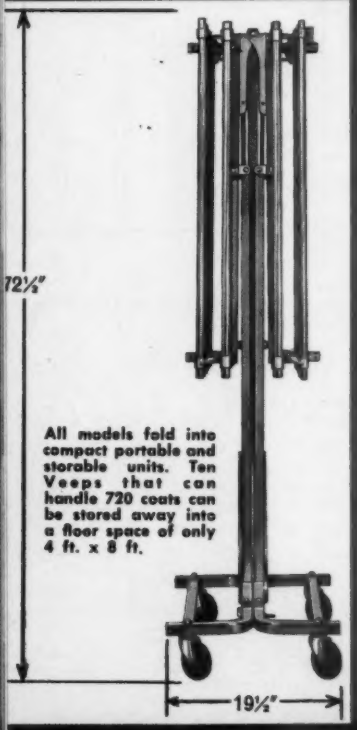
Four types: Model VP 12 hanger bars for 72 garment h and one shelf for hats.

Model VP 200 same as abo two shelves for hats.

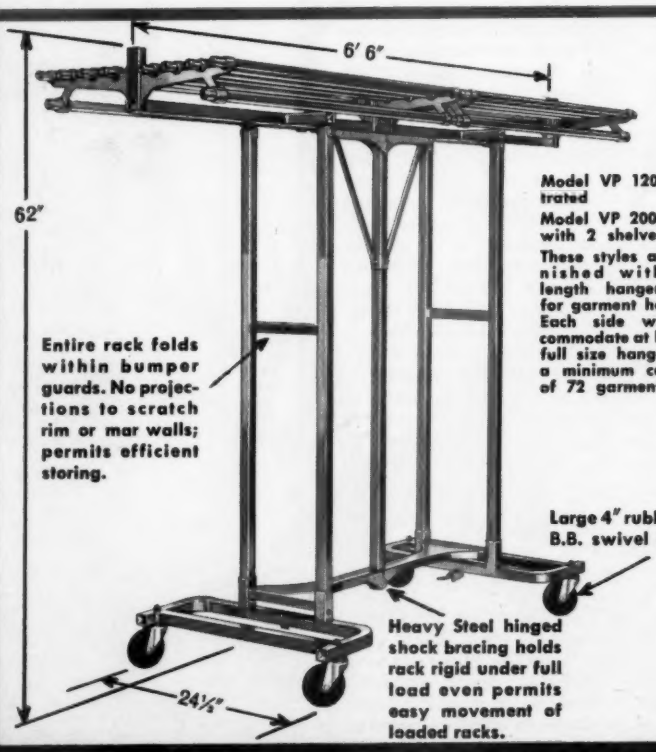
Model VP 130 with cast alu anchor coat hooks, capacity shelf for hats.

Model VP 300 same as V except with two shelves for h

One man can set up a Veep Wardrobe Rack in 3 seconds. racks are so carefully balanc unfolding and snap-locking rigid ready for use require raising ones arms in an sweep.



All models fold into compact portable and storable units. Ten Veeps that can handle 720 coats can be stored away into a floor space of only 4 ft. x 8 ft.



Model VP 120, illustrated
Model VP 200, same with 2 shelves

These styles are furnished with full length hanger rails for garment hangers. Each side will accommodate at least 36 full size hangers for a minimum capacity of 72 garments.

Entire rack folds within bumper guards. No projections to scratch rim or mar walls; permits efficient storing.

Large 4" rubber tired B.B. swivel casters.

Heavy Steel hinged shock bracing holds rack rigid under full load even permits easy movement of loaded racks.

MADE ONLY BY VOGEL-PETERSON COMPANY • ELMHURST, ILLINO

Write Dept. ASU-61 for Catalogs illustrating other racks in the Checker, Office Valet, Checkerette and Schooline racks.

CCV-61

G LABORATORY, SHOP, HOMEMAKING, SCIENCE

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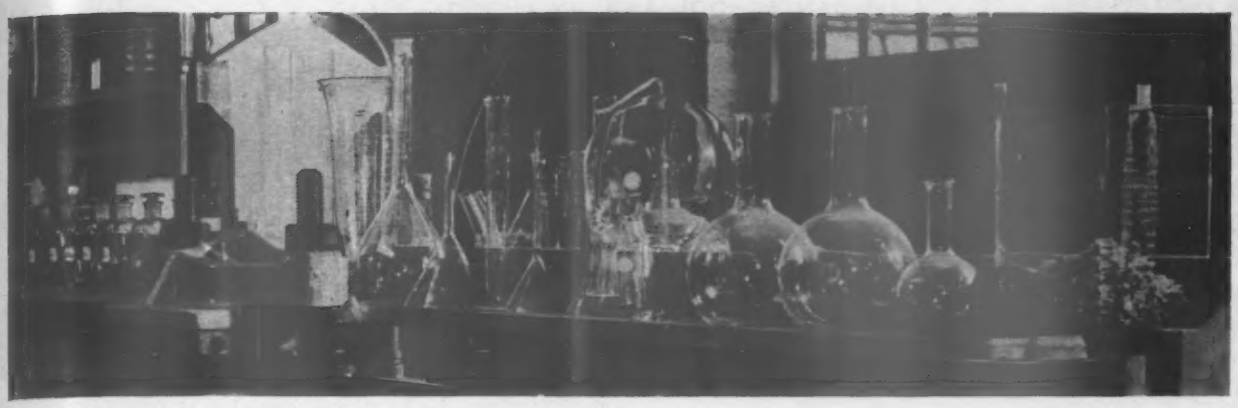


Testing laboratory, American Seating Company, Grand Rapids.

Science Education in the Atomic Age

by Albert F. Eiss

Science Specialist, Pennsylvania Department of Public Instruction, Harrisburg

Dr. Eiss has had 25 years of experience in teaching science to grades one through graduate school. More than half of those years were in teaching at the college level. He holds an A.B. degree from Houghton College, an M.Ed. from St. Lawrence University, and a Ph.D. from New York University.

IT WOULD BE presumptuous for a science teacher to tell an architect how to design a science laboratory. Yet it is equally unwise for an architect to design a laboratory without consulting science teachers. Planners of modern school buildings have to be diplomats, salesmen, financial wizards and, above all, prophets. Tomorrow's educational programs may be greatly influenced by the facilities provided today, and science facilities are no exception.

With construction costs at an all time high, there is a temptation to provide minimum facilities for today's program and to let tomorrow take care of itself. The problem is doubly critical because our educational program is undergoing major changes to meet the upsurge of knowledge that is equalled only by the upsurge of school population. Our philosophy of education, science education in particular, has undergone a searching analysis in the past few years. We now realize how inadequate our science instruction has been in some schools, and that major changes in plant and equipment will be required to provide an adequate program for all children.

Science education today places much emphasis on problem solving. The techniques involved are being introduced into classrooms at all grades, beginning with kindergarten, since science is no longer a high school subject. The introduction of problem solving techniques into the classroom means much individual work by students. By pointing out important provisions for tomorrow's science program, and by profiting from past mistakes, it should be possible to plan new buildings than can anticipate tomorrow's needs today.

Location and Orientation

If science laboratories are accessible to all science teachers, unnecessary duplication of expensive equipment may be avoided. All the sciences are interrelated, and any gaps between them are closing rapidly. There is a trend toward less, rather than greater specialization. Many items of equipment may be used in all science classes. The microscope, the oscilloscope and the recording thermometer perform equally well for biology, physics or chemistry. It is advisable to plan a science wing or section in a new building where all science classrooms and laboratories will be together.

Location of the biology laboratory is particularly important. Direct sunlight is needed for growing plants, so a southern exposure is called for. But if an aquarium is located in direct sunlight excessive algae growth occurs. So the room must have a balance of sun and shade for all requirements.

All spaces should have darkening facilities. Some equipment for visual aids—filmstrip, motion picture and micro projectors—works well in a partially darkened room. On the other hand, complete darkening is needed for projecting colored films and opaque materials. Shadow box screens or ordinary drapes will not do here.

Large Group Learning

Often an instructor will want to meet with all his students at one time. It is an unnecessary waste of time and energy to show the same film to classes for five successive periods. One reason why so few guest speakers are invited to talk to classes is that it is an imposition on their time to have to repeat their presentation to five or more classes. Hours of time can be saved if a teacher can meet with all class sections at one time. This is particularly advantageous when new material is introduced or when tests are given. The mean of class achievement in tests given to two or more classes seems to rise in direct proportion to the time lapse after the first test. Science classes might meet profitably in large groups at least twenty percent of the time, leaving the instructor free for individual conferences and work with small groups.

Large group learning requires an area that can seat about 150 students and has a demonstration table, motion picture projector, filmstrip projector, a screen and an opaque projector. An overhead projector would be useful too. The room should be easily and completely darkened. Further musts are controlled ventilation and comfortable seats, perhaps with movable tablet arms. Adjacent storage space is necessary and also a small room where teachers may prepare materials while the lecture room is occupied. The preparation room ideally should be accessible from the corridor so equipment and materials can be moved in or out without disturbing classes in the main room.

If funds are available, closed-circuit TV will provide a most effective teaching technique. Anyone who has observed science demonstrations from the back row of a classroom knows how difficult it is to see what's going on. With 150 students, accurate observation from the rear of a room would be almost impossible. A television camera pointed at the demonstration desk and a few receivers strategically located would give every student a front row seat.

The lecture room could be scheduled for every period in the week. English classes, social studies and mathematics would profit from a room like this. In fact, if other departments plan to use a lecture room, several such areas may be needed.

Storage Spaces

A common shortcoming of school buildings, new or old, is lack of storage space. With building costs mounting and space at a premium, this is

Cooney Studios

Student science table, shown above, used in Peabody High School, Pittsburgh, Pa., has interchangeable equipment wall panels nearby. (Courtesy E. H. Sheldon Equipment Co.) Reese, Mich., Community School, has a perimeter-planned science laboratory, photo left (courtesy Kewaunee Manufacturing Co.).

Round tables with common sink are at Merchantville, N. J., High School. (Courtesy John E. Sjostrom Co.)

where shortsighted planners think they can cut costs without impairing the program. Often when a school district is constructing a new building, there is a minimum budget for equipment and supplies, however badly they are needed. Consequently, storage facilities designed for immediate needs become overcrowded within a few years when new equipment is purchased. Once the building is completed, adding storage space is a difficult, if not impossible, proposition.

Another common fault of new buildings is the lack of storage facilities for special equipment. All science equipment cannot be stored in one room. Bulk chemicals require a dark storeroom separated from all other storage space. Even with careful handling, chemicals are corrosive and will speed up deterioration of metal. If expensive scientific equipment is stored in the same room with chemicals, corrosion will lessen the useful life of the items by many years.

Metal should be eliminated from the chemical storeroom as much as possible. Even metal shelves and shelf brackets are ruled out. Acid resistant surfacing should cover shelves and floors. A ceramic tile floor is recommended. If this is not feasible, an easily replaced surfacing material is desirable. Savings will never result from purchases of low priced wooden topped worktables and shelves unless they are treated with acid resistant paint. Flooring material that will show every spot and stain is not economical either, even though initial costs may be lower.

Not all scientific equipment will fit on standard shelves. Large pieces require special shelving; very small pieces are best stored in small bins or trays. Adjustable shelving means flexible storage space, especially if there are compact drawers and trays for small items of equipment.

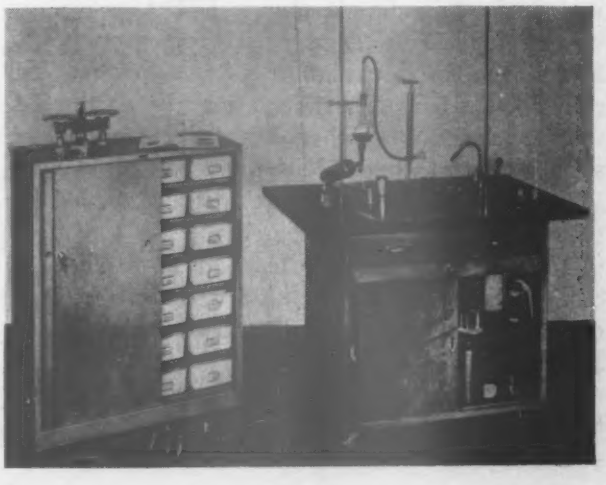
Multi-Purpose Rooms

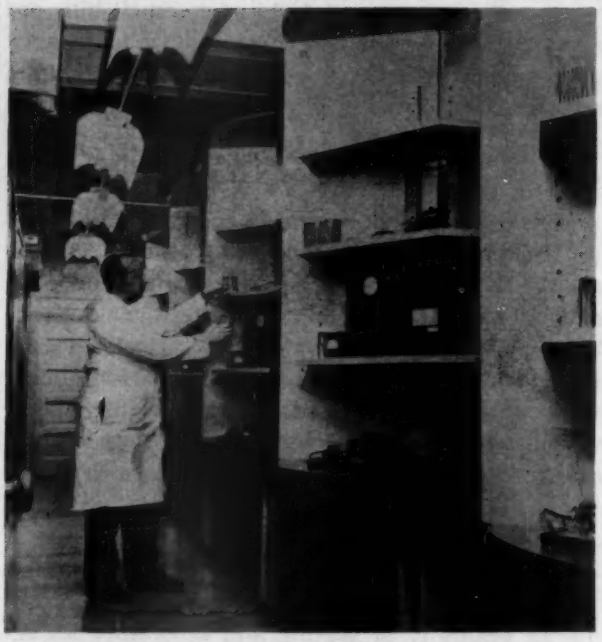
Science education is rapidly becoming laboratory centered. The old schedule of four days per week in a classroom and one in the laboratory is no longer effective. Most administrators now endorse peripheral arrangements of science classroom furniture. With such arrangements students can move from class discussion to laboratory work with a minimum of interruption. Peripheral room arrangements involve alternatives of room size and shape. The width of laboratory rooms has long been fixed by the width of other classrooms in a building. Is this necessary? It is possible that square, rather than rectangular rooms will permit greater flexibility of seating and laboratory areas.

The instructor's teaching habits also influence room arrangements. Some teachers prefer to have seating at the center of a room, with laboratory work space located on three sides. Others want all laboratory space at the rear and seating in front. This is not a real problem; a good teacher will readily adapt to differences in room size or arrangement.

The University of Illinois has been experimenting with a quick method of interchanging equipment, particularly in laboratories designed for more than one science. Rotating equipment shelves swing from the classroom to a storage room. Changeover from a physics to a biology laboratory can be made in fifteen seconds by rotating the shelves. If storerooms were built along two sides of a room such shelving would save many steps.

Mobile science demonstration table, completely equipped, facilitates lectures. Tote tray storage unit is also shown. (W. M. Welch Scientific Co.)





Rotary equipment shelves, from the storeroom side, as used in experiments at the University of Illinois. Shelves make quick changeover possible in a science room. (Hamilton Manufacturing Co., Two Rivers, Wisc.)

This type of installation might be most useful in small school systems where a single laboratory serves several sciences.

Work and Project Rooms

Another trend in science education is a teaching technique employing long-range projects. Students thus need work space where equipment can be set up and left for a considerable length of time. It is neither safe nor desirable to use the storeroom for this purpose. What is needed are several small rooms, with standard utilities and worktables, to house the long-range experiments.

Many experiments in biology require the use of animals. If only a few animals are involved, they may be kept in the classroom. But extensive use of any animals for experimental purposes requires a well ventilated workroom where they may be raised and where experiments may be conducted.

Office space is another essential for a modern science area. As schedule changes bring more flexibility to a teacher's program, space is needed for class preparation and research. In far too many of today's schools science teachers have offices in dark, unventilated rooms hidden under stairways or in basements. They deserve better than this.

Individual pupil conferences cannot be conducted in a busy laboratory. Students will want to consult the teacher's personal library for research and study. It should be near at hand. As the teaching program becomes more closely structured, time for class preparation and planning becomes essential. A sufficiency of office space will answer many of these needs.

Special purpose rooms also fit into the scheme of things. Pennsylvania's Superintendent of Public Instruction, Dr. Charles H. Boehm, is urging every school district to consider the advisability of including either a planetarium or an observatory in all construction plans, unless these facilities are available locally in other institutions. A greenhouse will serve the biology department. Other special purpose areas are a dark room, an electronics workshop and a museum for exhibits and specimens that otherwise might be discarded.

Schools are now recognized as community centers for adults. The addition of special purpose rooms broadens the services a school can offer and provides interesting and worthwhile topics for adult education.

Safety Features

Laboratory safety is one of the most neglected features of new school construction. Teachers are to be congratulated on keeping the accident rate low, but safe construction, rather than teacher alertness, should provide the basis for a safe laboratory. Many laboratories are without adequate fire protection; sometimes extinguishers are provided that are worse than useless for chemical or electrical fires. Electrical hazards are common, and chemical hazards are often ignored. Laboratory design cannot prevent students from careless practices or unauthorized experimentation, but it can provide quick first aid treatment of injuries should an accident occur.

All chemistry laboratories use toxic chemicals. Many are explosive if brought together in the proper proportions and under certain conditions. While such hazards can never be eliminated, immediate first aid treatment can be provided. The installation of an emergency shower and eye bath will cost relatively little, and may never be used. But if it is used just once to save the eyesight or prevent disfigurement of a student, its cost will be repaid many times over.

Since these emergency devices will seldom, if ever, be used, it is not necessary to provide a drain for them. And the absence of a drain may even discourage students from indulging in horse play with the equipment.

Individual Work

There is a pronounced trend toward individual student work using instructional aids. The central

library, small conference rooms or an alcove off the laboratory should be available to students for private sessions with recordings, tapes or motion pictures. Teaching machines are now available which can and should contribute actively to science education programs. They have much to offer for individual learning situations.

Class lectures or visiting resource persons are usually presented on a "now or never" basis. A student who is absent from school must catch up on missed lectures from friends' notes. The same thing happens with teacher or class discussion groups. There is no reason why the day's lesson could not be recorded on sound tape for use by students who have missed a class session.

Physics and Chemistry Rooms

Physics and chemistry laboratories are more expensive to install and equip than biology and general science rooms. Except in very large schools, it might be advisable to design a dual-purpose laboratory for both physics and chemistry. The combination laboratory should have an adjoining balance room with shelves which are vibration free. Such shelves are hung from the steel frame of the building or from a solid wall. Other areas needed are a darkroom, a separate small room for chemical storage and plenty of storage space for laboratory equipment.

In chemistry, considerable savings may be realized if semi-micro techniques are used in the laboratory. Smaller containers will be used and less storage space is required. Chemicals need not be stocked in bulk, with resultant savings in space requirements and fewer corrosion problems. Breakage is less, reducing replacement costs. Fewer chemical fumes will circulate around the building, and the student learns better laboratory techniques. The semi-micro laboratory technique saves on initial costs, operation costs and also provides a better program.

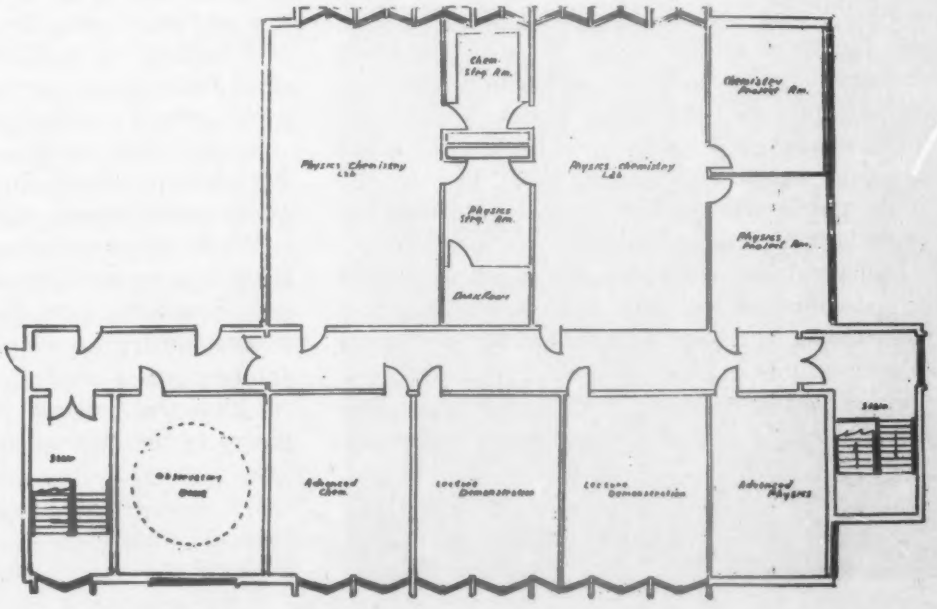
In physics rooms small AC-DC power supplies placed at several stations are less expensive and more flexible than one central installation. Most course requirements do not warrant the cost of a central power supply. Even for electronics experiments, a central supply is not satisfactory, because loading or unloading at one station produces current and voltage fluctuations at other stations. And centrally located power supplies are usually not adequately filtered to provide ripple-free DC for electronics experiments.

Biology and General Science

Biology and general science laboratories have simple requirements and can be designed along similar lines. If water, gas and electricity are supplied at three sides of the room, tables need not be stationary. All biology laboratory tables should have AC outlets as a point of necessity. If this feature is neglected, microscope work may require extension cords to bring power to lamps. This is a serious hazard for students who may trip and fall over the cords, and there is the added danger of dragging down a piece of expensive equipment.

Peripheral arrangement of all utilities means a flexible classroom situation. Small portable AC-DC power supplies work equally well for either biology or general science.

Laboratory science will be taught in tomorrow's junior high school and an all-purpose laboratory will be part of every junior high school science



Suggested floor plan for a physical science laboratory. Areas include lab and demonstration rooms and space for an observatory. (Courtesy Astrodome, Inc.)

class. The old stand-by demonstration table will be used often, but there will be a call for equipment for individual experimentation. The trend toward individual or small group experimentation is already gaining impetus in junior high schools, and it is very probable that any new school without facilities for these activities will be outdated by the time it is built.

Short laboratory sessions will be scheduled for junior high school science classes and experiments will not be as elaborate as those in senior high schools. However, gifted junior high students will be able to perform individual and long-range experiments and should have space and equipment for these activities.

Students will consult reference materials and periodicals more frequently than at present. Either the library must be enlarged for reference work groups or classroom space must be provided. A rigid library schedule deters individual research. A small conference room in the science area might solve the problem, and students could work here in privacy. Make sure there is plenty of shelf space for the science reading materials that add quality to the science program.

It is now possible to install portable wall partitions that may be moved to meet changing program needs. With such walls a room can be enlarged or several small rooms added at a minimum of expense. If present space is completely inadequate, it might be practical to add a few large rooms and divide existing space into small conference or individual project rooms.

In the future, problem solving science experiments will be carried on in elementary schools as well as at higher levels. Every elementary room will need at least one gas outlet, several electric outlets, a sink with running hot and cold water, and plenty of storage space. Science equipment that was once exclusively used in the senior high school is now part of primary grades. Beakers, test tubes, magnets and balances are becoming familiar to primary pupils. In time to come, intermediate grade pupils will perform experiments done by yesterday's high school students.

Primary grades will need a science center planned in one corner of the room, with aquariums, storage facilities, and other equipment. Better students in intermediate grades will benefit from a general purpose science room equipped like a junior high school science laboratory. Local needs and conditions will determine use of such an installation.

It is apparent that these innovations will require an increased building budget. A building that will keep up with tomorrow's science programs will undoubtedly cost more than today's counterpart. School boards and parents have always provided funds for essential facilities. An adequate science area is as essential as a library, music room, gymnasium, athletic field or swimming pool. Even though some of these facilities may be considered non-essential luxuries, well equipped science areas are definitely a necessity.

With wise planning, costs can be reduced without sacrificing the quality of science programs. If economies are necessary, the following suggestions might be helpful:

1. Use homemade shelving instead of expensive cabinets in storage areas.
2. Leave some storage areas to be finished at a later date.
3. Suggest a semi-micro chemistry laboratory.
4. Use portable AC-DC power supplies rather than a permanent installation.
5. Avoid unnecessary duplication of space. When rooms are occupied every period of the day, requirements can be reduced considerably.
6. Plan for utility rather than appearance. A cement block wall may serve as well as a tile wall, and is a lot cheaper.

When every means of economizing has been exhausted, and minimum essentials have been determined for the program, neither the school board nor local citizens should force an undesirable compromise that will limit the quality of the school program for years to come. Experts can be called in to discuss the problem with community leaders, and it's a good bet that a majority of them will back up requests when they understand the need for science space and equipment.

We cannot improve science teaching without using the new techniques being developed. Building planning should further, not hinder, science teaching techniques. Often this is not the case.

When we give our teachers maximum facilities for a superior instructional program and encourage experimentation with new ideas and techniques, progress in science education is possible. Forward thinking and planning insure an effective school program and prepare our children to take their places as the citizens and scientists of tomorrow.

Automation and Vocational-Technical Facilities

by W. A. Williams

State Director of Vocational Education, Department of Public Instruction, Indianapolis, Indiana

Mr. Williams is a graduate of Purdue University. He taught in the public schools of Indiana and also at Purdue before joining the staff of the Indiana State Department of Public Instruction. He has been with the state department since 1941, with a three year interruption for war service.

WHAT IS THE IMPACT of automation on facilities for vocational-technical education? Reactions to automation have been few and far between in schools of the country. Not too much thought has been given to the matter, except in a certain limited sense. There are instances where vocational-technical facilities meet specific automation-training needs of a local industry. In these cases a few items of special equipment and recently developed instructional materials, directly related to the procedures, have been provided for use by students and instructors. However, the thorough thought and advanced planning needed to develop programs which will prepare individuals for highly automated business and industrial situations have not, as yet, been undertaken to any great degree.

Discussions were held among Indiana's teachers, supervisors and administrators in the field in an attempt to bring this whole problem into an actual planning situation geared to the educational needs of in-school youth and adults. We came up with a series of conclusions concerning what automation's continued progress will mean in terms of training facilities in our vocational and technical programs.

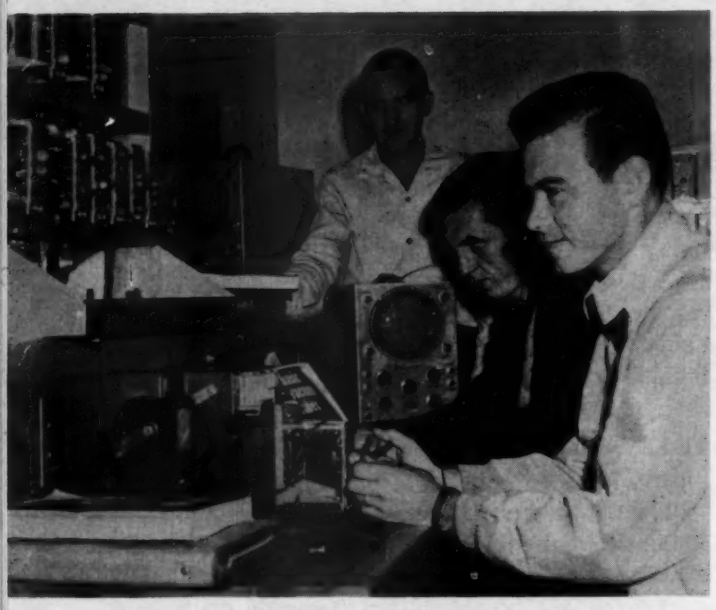
First, it was thought by many that the design and placement of facilities within a given building space must be even more flexible than at present. Flexibility is mandatory because the steadily forward movement of business and industry will result in multitudinous changes. Some changes will require only minor modifications in school facilities. Others will be of a drastic nature, calling for major changes if educational programs are to keep up with the advances.

Perhaps highly specialized items of equipment will be secured on a loan or lease arrangement from industry. In any event, our administrators share the feeling that it will no longer be possible to equip a given shop and then anticipate few changes during the normal life expectancy of the equipment. We may find that machinery and other items will suddenly become obsolete and useless. Thus, the element of flexibility also has a direct bearing on matters of budgetary concern.

Shop Becomes a Laboratory

No longer will we be able to state that "a shop is a shop is a shop." With the facilities necessary for training individuals in the automated processes there

Automation programs may cause many, but not all, items of equipment to become obsolete.



Electronics laboratories will take on new dimensions as automation programs expand.

is every probability that the erstwhile "shop" will bear closer resemblance to a "laboratory." The automated processes deal in large part with control, measurement and diagnosis in the areas of electronics, pneumatics and hydraulics. The common tools, gauges and other equipment of general machine shops, for instance, are not part of the automation picture. From the standpoint of a room or space being utilized more as a laboratory than a shop, the problems of building construction, lighting, heating, air-conditioning, power supply, etc., call for new solutions to meet changing requirements.

Both the related and practical aspects of vocational-technical education will reach new heights of attainment. The consideration and practical application of precision measurement will deal with tolerances that were once thought to be completely unreasonable. With the direct application of automation to the control of machines and devices regulating product and materials movement, timing and precision are most important.

Students and instructors in the vocational-technical shop-laboratories will be engaged more and more in diagnostic and experimental types of work. It will be commonplace to find only the automatic control units in the school situation, with production equipment available in limited amounts or located entirely in the industrial establishment. Increasing attention will be given to the adjustment and modification of existing automatic control devices. Programs will devote much time to the actual designing and building of highly specialized pieces of equipment with their controls.

Mobility of equipment will be especially significant from the standpoint of meeting new and changing training needs in particular communities. Fortunately, much of the new equipment which is necessary to automation lends itself quite readily to this purpose. In electronics, for instance, master power control panels and student training station set-ups can be moved from school to school to meet enrollment demands.

Cooperative Programs

Another condition which automation may impose on vocational-technical education may well be the expansion of our cooperative-type training programs. So much of the new equipment required is expensive and not readily accessible for wide-spread use. To make such equipment available both in production and training, it may have to be used within actual business or industrial establishments.

Automation further complicates the ever present problem of keeping our personnel, facilities, course content and related technical information in step with industrial developments. It becomes more and more important for all persons involved in vocational-technical education to work in close cooperation with business and industry, not only to keep up with current production and service techniques, but also to become familiar with industry's projected planning advancements.

If vocational-technical education is to render satisfactorily those services for which it is responsible in this automated age, complete coordination with expanding industrial and business activities is an absolute necessity. No functional program can be entirely school contained.

Forster Studio

(Photo courtesy Kewaunee Mfg. Co., Adrian, Mich.)

Adding Variety to Homemaking Programs

by C. Aileen Ericksen
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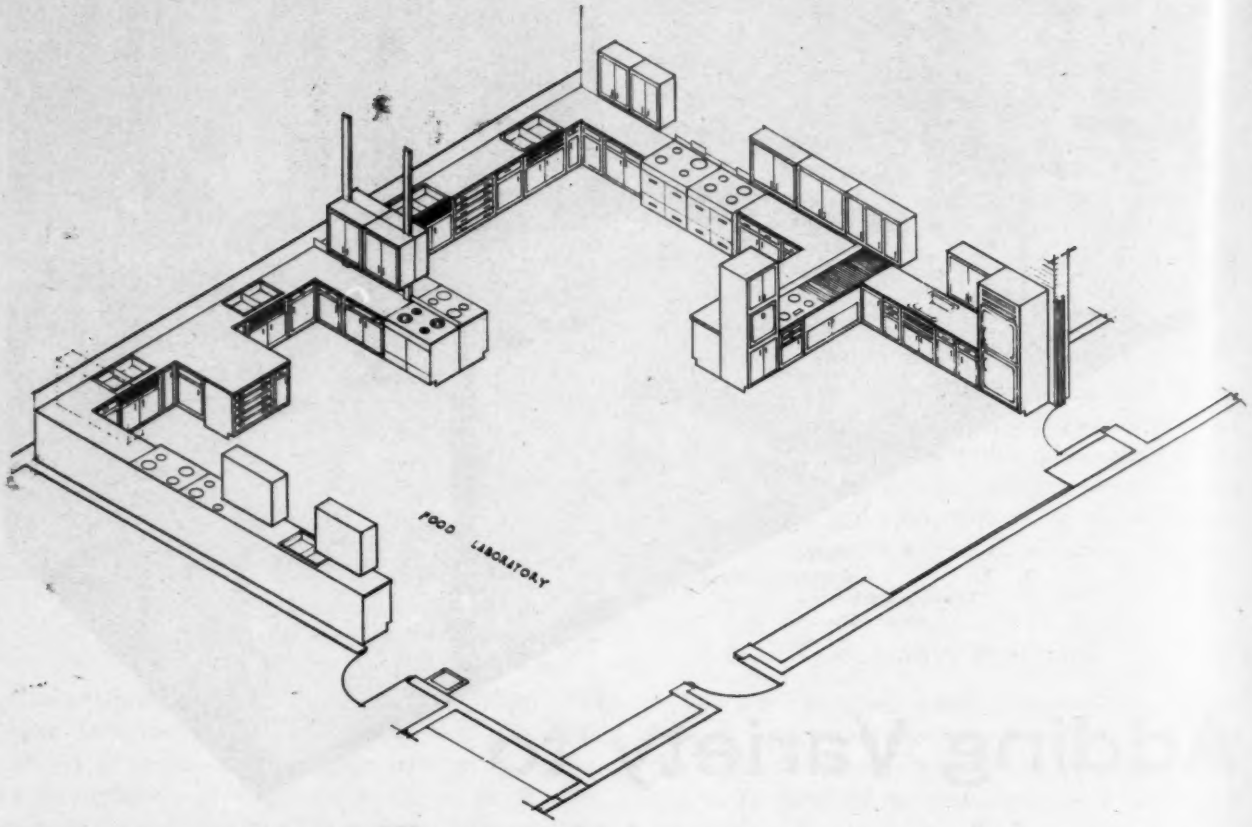
Miss Ericksen received her B.S. degree from University of Utah and M.S. from New York University. She has been a homemaking teacher in high schools at Mt. Pleasant and Brigham City, Utah, and a college instructor at Pennsylvania State College. Miss Ericksen has been state supervisor in Utah since 1945.

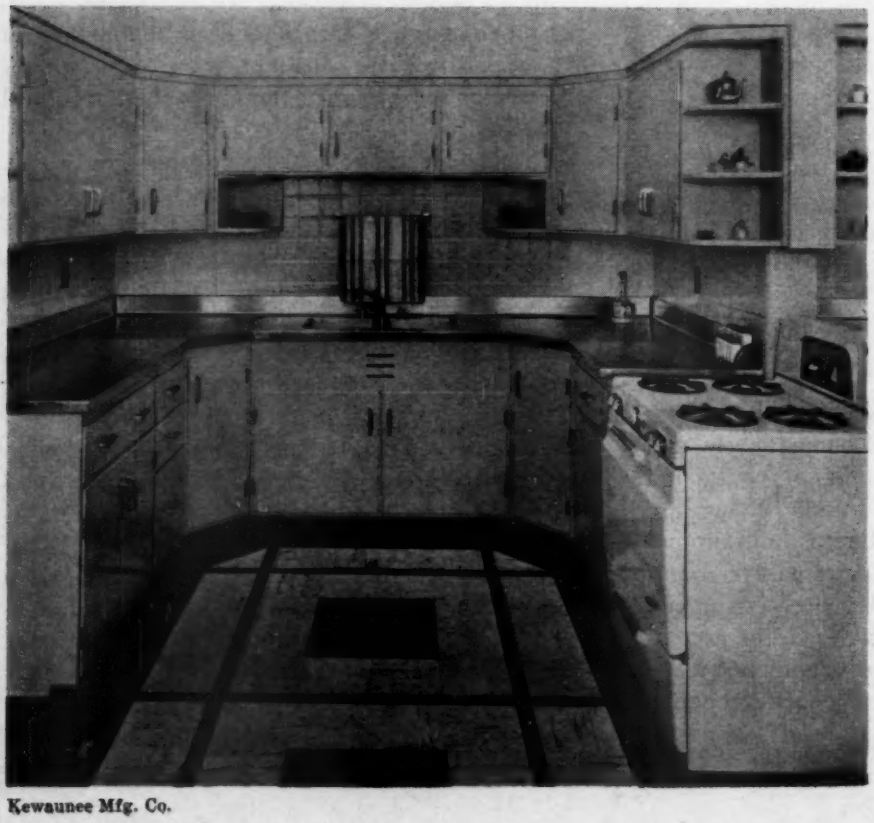
THE OVERALL OBJECTIVE of homemaking education is the improvement of home, family, and community living through training of youth and adults. Values of wholesome family living are stressed. The curriculum, therefore, is built around those activities which are an integral part of American family life today. An adequately equipped homemaking department contributes to the accomplishment of this objective and program when it:

1. appeals to students of all socio-economic levels.
2. provides space, furnishings, and equipment to teach all phases of the program.
3. creates something of the atmosphere of a real home.
4. is efficient and easy to keep orderly and clean.
5. is designed and equipped to give students an opportunity to develop good habits and acceptable standards of work.
6. provides opportunity for a variety of learning experiences to reach desired goals.
7. is furnished, equipped and decorated to give students an appreciation of quality and beauty in their surroundings.
8. is designed to be adaptable to changes in enrollment and in organization, content, and new teaching methods.

Planning the homemaking education facility may be accomplished as part of the total planning of a complete new secondary school plant or as an addition to or as a remodeling project in an existing secondary school. In either case, the procedures are essentially the same. A committee of carefully selected individuals should prepare the educational



Activities of the food laboratory include the selection, purchasing, preparation, serving, conservation and storage of food. Students should also have a discussion area.



Kewaunee Mfg. Co.

Each activity of the homemaking department requires a certain amount of space for efficient performance. Requirements will vary from situation to situation.

specifications. This committee may be part of a large general committee, if the homemaking facility is part of a large planning group, or it may be a committee working alone on a remodeling assignment.

Administrators, district wide, and the local school administrator, homemaking teachers, selected school patrons and students should constitute the committee members. The services of the state's home economics supervisory staff should also be incorporated into the committee's work. The first task is to draft a comprehensive description of the homemaking program. Needed features are listed in detail. The architect should be consulted during the whole planning process. Once the committee has completed the educational specifications, space allocations and arrangements are the responsibility of the architect and the central administration.

Functional Organization

Homemaking facilities provide an area for real living. The emphasis of curriculum and teaching methods is upon learning by doing. Much activity is carried out in cooperative groups. Students help to identify and formulate the problems to be dealt with, and help organize materials to be used. Space and equipment should be functionally organized into a number of centers—foods, clothing, homeliving, child care, home nursing, laundry, reading and reference, etc. The nature of the activities and the teaching methods commonly used suggest the wisdom of restricting class size to a maximum of 28 students.

Equipment needs require careful study.

The Lattimer Studios

Mutschler: Nappanee, Ind.

The pattern of organization of the homemaking curriculum may vary from the traditional separation into different class groups of foods, clothing, home management, etc. to the integration of these areas of the curriculum so that one teacher deals with all of them for each class group. In the first instance the facilities for each subject and related activities are designed within or adjacent to separated areas. Whereas, in the latter case, all-purpose rooms accommodate all units of the homemaking curriculum, with one teacher for each such room.

In small high schools, where one-teacher departments are common, the all-purpose or multi-purpose homemaking unit is the most economical way to provide needed facilities. In junior high schools, and even in large senior high schools, there is a definite trend toward organizing the homemaking curriculum on an integrated basis, and all-purpose units are provided in sufficient number to meet a school's population and program demands. Any planning of specific facilities and formation of educational specifications should be based upon supervisory decisions regarding curriculum organization.

New Emphasis

A new emphasis on the organizational pattern of instruction is being promoted by the National Association of Secondary-School Principals, and may change educational facility specifications. This emphasis is explained in the following two bulletins: "Design for ETV," Educational Facilities Laboratories, Inc., 466 Madison Avenue, New York 22, New York, 1960; and Trump, J. Lloyd "Images of the Future—A New Approach to the Secondary School," National Association of Secondary-School Principals, NEA, 1201 Sixteenth Street, N.W., Washington 6, D.C., 1959. There is no charge for the bulletins.

Three kinds of activities characterize the new plan: large-group instruction, small-group instruction, and individual study. In large-group instruction there may be 100 or more students. It is planned that about 40 percent of a student's time might be spent in groups of this size. Small-group instruction might consist of 12 to 15 students and a teacher, and it is suggested that about 20 percent of the student's time be spent in these groups. Individual study would consume the remaining 40 percent of a student's time, and would take place in the school or the community. Students would study alone or in groups of two or three.

It is conceivable that many aspects of the homemaking program will fit into this new plan and educational facilities will thus need to be adaptable to it. Large groups will not necessarily occupy the homemaking department, but might use the auditorium or cafeteria. Individual work could be carried on in libraries, museums, industry, homes, business, government agencies, etc. Small groups or individuals will work in homemaking rooms flexible enough to allow discussion or experimentation, demonstrations as well as laboratory group work. It is suggested that the department have such facilities as television, radio, tape recorders and similar equipment.

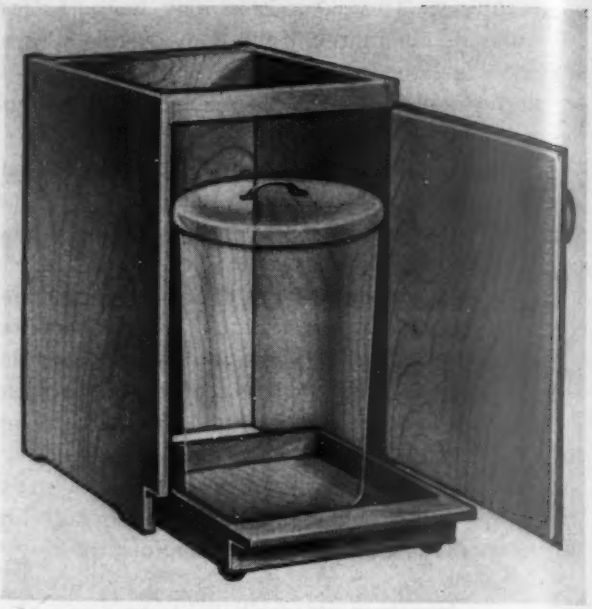
This plan again emphasizes the use of an all-purpose or multi-purpose room rather than a specialized facility. Adaptability is an aspect of the teaching program which will have the most influence on facility planning.

Depending upon the size of the school and upon basic decisions of curriculum organization patterns, the following space divisions have been found satisfactory:

1. One all-purpose room
2. One all-purpose room plus a hospitality room
3. Two all-purpose rooms plus a hospitality room
4. Two all-purpose rooms plus a specialized clothing laboratory plus a hospitality room
5. One all-purpose room, two specialized rooms and a hospitality room
6. One all-purpose room, two specialized rooms, one homeliving room, and a hospitality room
7. For larger schools other satisfactory combinations may be worked out.

Organization by Units

Homemaking programs cover a carefully planned and coordinated sequence through junior and senior high school. The scope of the program re-



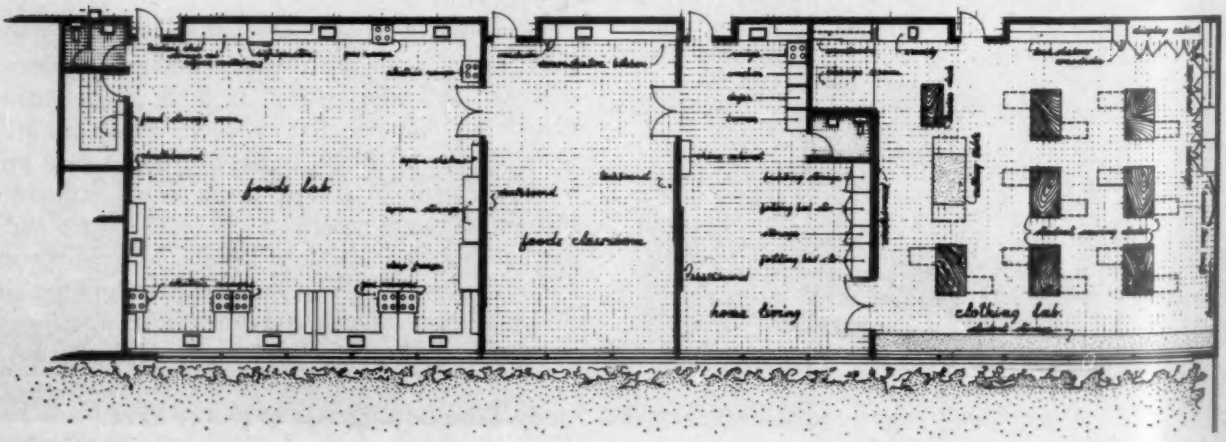
Department planners should determine whether or not cabinets will be built-in or movable units.

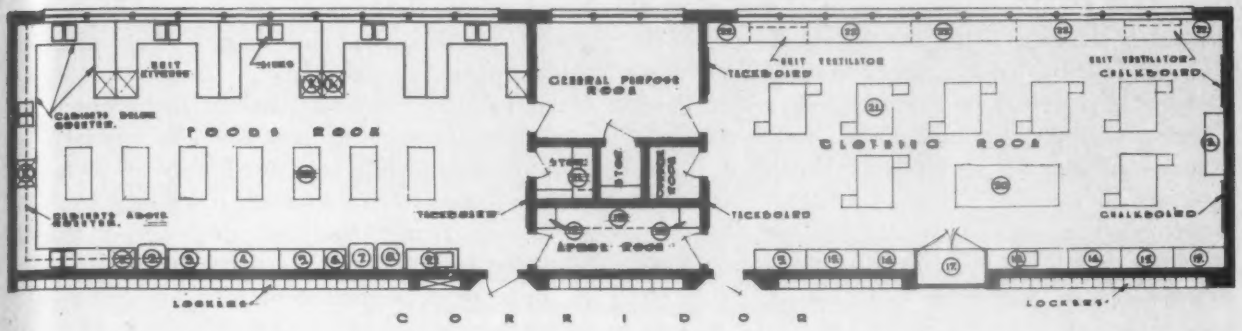
quires specific facility planning and should be clearly visualized as educational specifications are formulated. Suggested spaces for the activities, furniture and equipment are presented here without reference to the general room pattern or course organization.

Care and guidance of children requires a discussion area to accommodate a full class and a play school area. Furniture and equipment should include comfortable seats for students, chalkboard-tackboard, chairs, tables, books, paints, easels, wardrobe facilities, etc. Storage facilities are needed in the form of bins, filing cabinets, casework sized for posters, charts, books, paper, paint and child care supplies and for folding tables and chairs.

Personal and social development requires a discussion area to accommodate a full class, a hospitality room for daily use, and good grooming facilities

Homemaking classrooms can interconnect for flexible programming as at the Orem Senior High School, Orem, Utah. William Rowe Smith is the architect





← HOMEMAKING UNIT →

KEY:

① RANGE.
② REFRIGERATOR.
③ MAGAZINE RACK.
④ STOR. CABINET. CHALKBOARD ON DOORS.
⑤ TEACHER'S CASE.
⑥ STORAGE CABINET.
⑦ DRYER.
⑧ WASHER.
⑨ SINK UNIT.
⑩ TABLE.
⑪ BINS FOR FLOUR, VEG, SUGAR. SHELVING.
⑫ REFUSE STORAGE.
⑬ APRON STORAGE. CABINETS ABOVE.
⑭ EQUIPMENT STORAGE.
⑮ WARDROBE WITH MIRROR.
⑯ WARDROBE.
⑰ DISPLAY CASE WITH CHALKBOARD ON DOORS.
⑱ GROOMING CENTER.
⑲ IRONING BOARD STORAGE CABINET.
⑳ CUTTING TABLE.
㉑ SEWING TABLE WITH TWO MACHINES.
㉒ TOTE TRAY STORAGE CABINETS.

Junior high school homemaking department shown above has two specialized rooms and small central general purpose room. Storage is provided. (South Davis Junior High School, Salt Lake City, Utah, Scott and Beecher, architects.)

Hamilton Mfg. Co. Photos

If area is available, large size cutting tables may be provided. These should have functional surfaces of materials like cork, linoleum or masonite.

located for demonstration purposes, usually in the clothing area. Furniture and equipment include comfortable seats for students, chalkboard-tackboard, furniture and articles for a small living-dining room, sink suitable for shampooing, mirror. Bins, filing cabinets, casework for books, posters, charts, instructional supplies and materials, and cabinets for combs, brushes, etc., will fill storage requirements.

Money and time management also uses a full class discussion area and display space. Furniture should include seats for students, chalkboard-tackboard and a display table. Filing cabinets, casework for books, posters, charts, instructional materials and supplies and casework for exhibits complete the equipment needed here.

Selection, care, management and furnishing of the home will have a discussion area for a full class, hospitality area for the study of furniture design and arrangement, flower arrangement, etc., and a work area for making slipcovers, draperies, etc. Activities of this section call for comfortable seats for students, chalkboard-tackboard, furniture for the living-dining area, and shelves and surfaces

throughout for use in arrangement of flowers and decorative objects. Storage will include casework and cabinets for books and instructional materials, shelving in casework or closets for draperies, floor covering samples, pictures, flower containers, decorative objects, old magazines, models of furniture, etc.

Selection, purchasing, preparation, serving, conservation and storage of food also needs a discussion area to accommodate a full class (may be in front of demonstration facilities), unit kitchens (four girls may share each unit), laundry facilities, food serving area and facilities for special guest dinners (normally a part of the hospitality area). A straight wall or L-shaped demonstration kitchen can be used here, as well as cabinets for supplies, utensils and equipment used in demonstrations, refrigerator-freezer, magazine rack, chalkboard (portable), tackboard, dining table and chairs (may be in hospitality area), unit kitchens and serving area, and food preparation equipment. Extensive storage needs include casework cabinets for instructional materials, posters, etc., bookshelves, special storage for large equipment used only occasionally, apron storage for all students using room, special storage for linen, china, and silver, special storage for students' products, special storage within kitchen units for equipment items.

Selection, purchasing, care, renovation and construction of clothing requires a demonstration area, discussion area (may be in connection with demonstration space), a work area for clothing construction activities, laundry facilities (may be located for joint use with foods) and a fitting area. Furniture and equipment include tables and chairs, chalkboard, tackboard, sewing machines (two girls

Supervisory decisions regarding curriculum organization should govern any specific planning of homemaking facilities.

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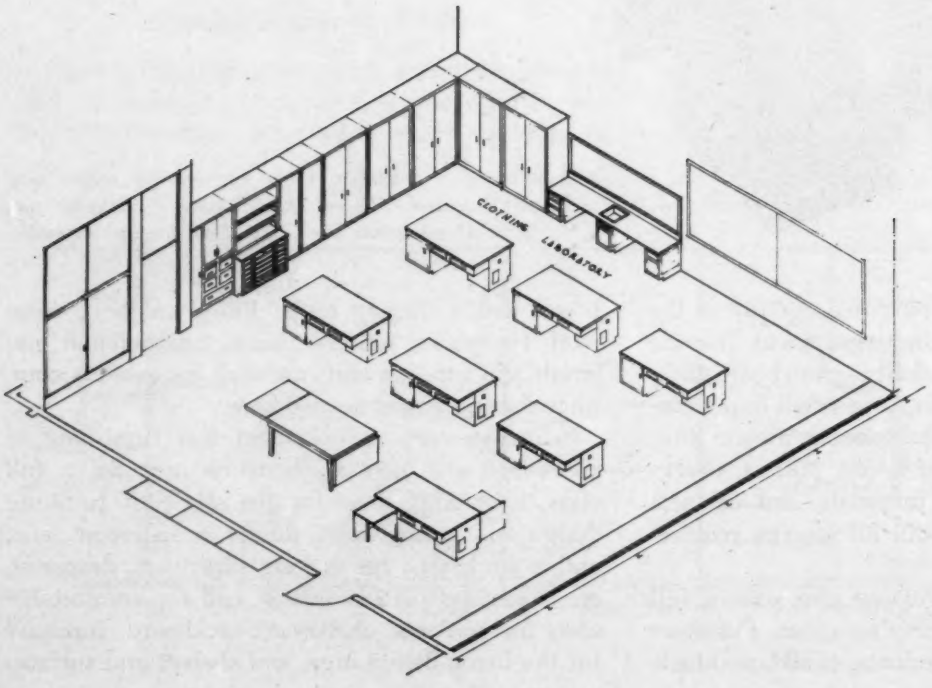


Furniture and equipment for the clothing area might include tables and chairs, chalkboard, tackboard, sewing machines, fitting mirrors, fitting screens, portable ironing boards, sink, tote trays and cabinets, and storage for garments, charts, posters, books and ironing equipment.

Courtesy Kewaunee Mfg. Co., Adrian, Mich

The homemaking curriculum is built around activities which will foster the improvement of home, family and community living.

may share one machine and machines may be combined with tables or separate), fitting mirrors (preferably set into storage cabinet doors), fitting screens, portable ironing boards, sink separate from good grooming sink, electric outlets flush with floor, sufficient for equipment with minimum of cord. Tote trays (enough so each student may have one) and tote tray cabinets serve best here. Also needed are storage for partially finished garments, casework and cabinets for pamphlets, charts, posters, books and special storage for ironing equipment, machine attachments.

Family health and safety should have a discussion area supplemented by a demonstration area for such procedures as care of patients in bed. A folding bed may be adapted for varying uses and may have blocks for elevating. A table, wash basin, pitcher, blanket, sheets, pillows and cases and miscellaneous improvised equipment will be used in this division of homemaking. Storage is needed for all items. However, in school districts having more than one high school this equipment may rotate from school to school. In this event, central protective storage is necessary. Also, Red Cross centers may supply the equipment at time of use.

Locating the Facilities

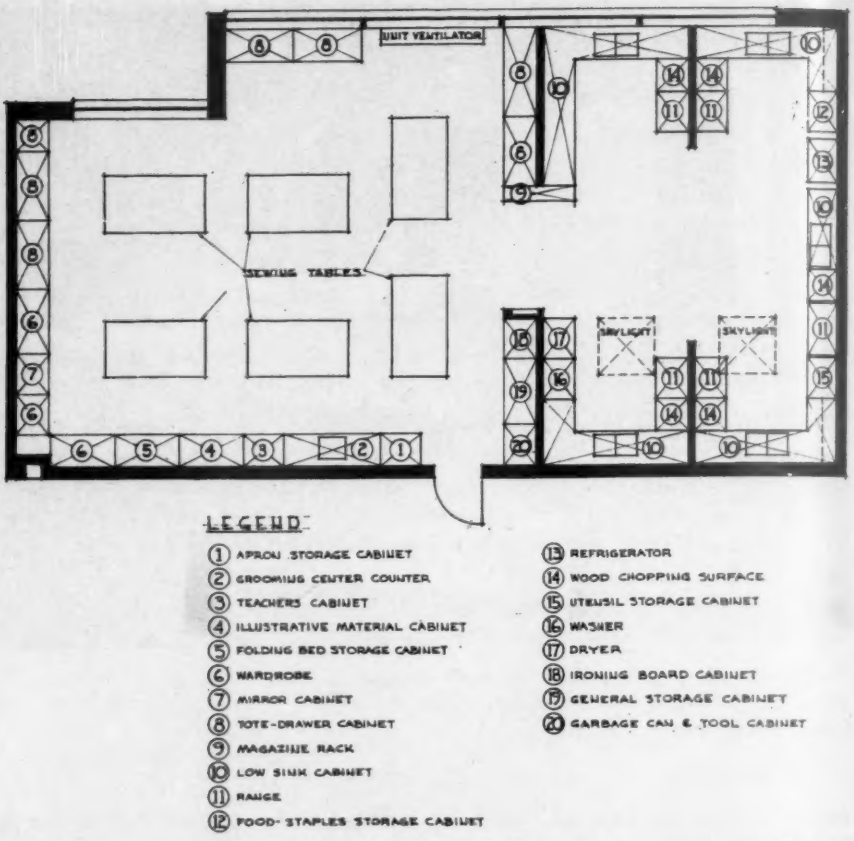
The preferred location for homemaking facilities is on the ground floor of a building for conveniences of delivery and removal of waste. Also, the child care unit of the program particularly requires easy access, and use of the whole department by adults after regular school hours is better managed with ground floor locations.

Consideration should be given to locating homemaking facilities with respect to affinity with other parts of the curriculum; for example, industrial arts, arts and crafts. The possibility of future expansion of the homemaking program and the consequent need for additional homemaking facilities should not be overlooked. In this connection, the layout of plumbing and other service systems should foster such expansion.

The Electrical System

The design of the electrical service system for homemaking facilities requires special attention. Circuits must provide a capacity ample for sewing machines, electric ranges, washer, dryer, ironer, refrigerator, freezer, numerous small appliances and for adequate levels of artificial, low-brightness lighting. The common design error has been failure to provide 220-volt circuits for the domestic type electric ranges, washers, dryers, and water heaters. If basic design for the school provides a lesser voltage, it is mandatory to install special transformers which will deliver the higher voltage needed for effective use of the basic appliances.

A separate control panel for the homemaking area is desirable. It should be possible to cut off



This all-purpose, one teacher unit is well organized despite limited area. Electrical circuits are controlled from a panel located on side of the cabinet case. (Altamont High School, design by Cannon and Mullen, architects.)

the current to all outlets and equipment except circuits for the refrigerator and freezer.

Special floor outlets should be staggered in the room for flexible room arrangements of tables and machines used in the clothing construction. These outlets should be flush with the floor in boxes with slanted outlets, similar to "floor pockets #0950 series Westlight."

Determination of the amount of space needed in the homemaking department is a matter of arithmetic. Each activity requires a certain amount of space for efficient performance. Each piece of equipment has certain dimensions, as determined by experimental use and now standardized by equipment manufacturers. The efficient flow of activities and their inter-relationship in a time sequence will also be considered in determining space allocation. Activities carried on in the department involve access to and use of various items of equipment. Circulation and passage also call for specific amounts of space and space arrangement. Equipment, material, and supplies require storage in convenient amounts and locations.

Specific Equipment Needed

Specific equipment requirements are described below for separate units of the homemaking department in the interest of clarity, emphasis, and convenience. In actual practice some of this equipment may have multiple usage in several areas of the curriculum.

Clothing unit: Major activities within this unit include construction and fitting of all kinds of apparel. Procedures may include cutting, constructing, and pressing; observing demonstrations, taking part in group discussions, etc. Common practice includes good grooming activities within the clothing unit. Needed for these activities are:

1. A demonstration and discussion area.
2. Working tables, preferably 42″ x 60″ and 28″ to 29″ high. If the room is large enough these tables could be 72″ in length.
3. Sewing machines. These should be provided at a minimum of two girls to a machine. One extra machine for special use is desirable. These machines are preferred in tables rather than separate.
4. Chairs. Height from floor is determined by height of table and size of students. 17″ to 19″ is common.
5. Plenty of electrical outlets, floor type, one for each machine or one to electrify the table. Waist high wall outlets should also be provided at about four convenient locations.
6. Cutting surfaces. In addition to worktables the surfaces might include tops of tote tray storage cabinets at 36″ to 39″ from floor, (such cabinets may be best

located on the window wall side of the room), folding tables (preferably 42″ x 72″ and from 36″ to 39″ high), and separate large tables (advisable only in specialized rooms, and then only when the room area has been calculated to accommodate such a table). The finish of the cutting surface should be functional, cork, linoleum or masonite for example.

7. Tote trays and convenient storage. Trays should be lightweight and durable. Trays milled of solid woods are usually too heavy and bulky.
8. Storage cabinets for tote trays. These may be 84″ x 48″ storing 48 trays or 36″ x 60″ holding 24 trays.
9. Fitting area. One convenient arrangement is to place mirrors inside doors of a storage wardrobe cabinet. These may be opened for viewing and closed during classroom activity. A separate fitting room is not recommended. A portable tackboard or folding screen may be placed in front of mirror for privacy in changing clothes, but the fitting process should be a part of total classroom activity.
10. Pressing equipment. A cabinet for storage of three portable ironing boards and asbestos shelves for storage of irons, pressing cloths, etc. should be provided.
11. Magazine rack and other storage racks should be large enough to hold commercial type pattern books which are thicker than ordinary magazines. A fine cabinet has been commercially built which includes a section for storage of charts and posters, a book shelf storage unit and file drawers for teacher's use.
12. Storage of illustrative materials, preferably a large case with adjustable shelving.
13. A sink. This might stand free in the room or be enclosed in a cabinet utilized for storage of cleaning supplies and equipment (perhaps located in the grooming center).
14. Good grooming center. At least one sink set in a cabinet with counter space and storage unit extended at the side. Open counter space for center seating allows for better use of space. A wall mirror above counter completes the unit.
15. Garment storage cabinets, allowing garments to hang full length without crushing or crowding. There may be one or more large cabinets or several smaller ones for separate class use.
16. A display cabinet opening into center corridor to show classroom activity to other students. If set into the wall it should have doors which open into room area and would have interior lighting and tackboard at ceiling as well as sides and back.
17. Storage unit for personal books and purses, close to the entrance.
18. Personal storage for teacher in form of a locked cabinet, with room for personal wraps, books, etc.

Foods unit: Major activity in this unit includes: planning, preparing, and serving food, observing demonstrations, taking part in discussions. These actions need special cabinets and equipment including:

1. Demonstration area with chalkboard space, refrigerator and freezer, food waste disposal, demonstration table (on wheels) which can also be used for special supply table.
2. Unit kitchens sufficient in number to satisfy enrollment and educational philosophy. These may be "U" type, "L" type, or "straight wall" type, and will include ranges, one for each unit kitchen, sinks, one for each unit kitchen (with double bowl), generous amount of cabinet storage. The location and size of drawers and shelves for storing various equipment should be designed primarily for the food curriculum. Also required are a working area, counter space (minimum of 10 feet for 4 students), counter height (normal is 36″), counter surface (of material easily cleaned, hard to mar, and resistant to heat, stain, and acid), storage for small electrical equipment, equipment for meal service, tables (all purpose rooms may use the same tables for meal service and the general classroom).
3. Chairs may be the same as for other activities or special ones for meal service.
4. Apron storage. A cabinet which has pull out or circular hooks for full apron hanging is preferred. The width of the cabinet used will determine storage space available. Whether or not to provide one cabinet for total needs or a separate cabinet for each class storage will be determined by school philosophy.
5. Garbage can storage is best provided close to entrance door, and may be either 36″ high with counter top or full height with storage above.
6. Cleaning equipment and supplies storage

Homemaking facilities provide an area for real living. Curriculum and teaching emphasis is learning by doing.

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should accommodate sanitary handling of brooms, sponges, soaps, cleansers, etc.

7. Instructional materials storage is the same as listed in clothing unit if an all-purpose room is provided, or it may be additional.
8. Magazine rack, same as above.
9. Food storage. A locked cabinet for special food storage may be placed within the unit kitchen and used for demonstration. This may include two or more metal bins for vegetables and two or more large canisters for bulk quantities of sugar and flour. Doors of food cabinets should be vented.
10. Laundry equipment may be located in foods area, clothing area, or home living space. Its location should permit convenient joint use without undue disturbance. The facility should include: washer, dryer, or a combination of both in one, ironer (if desired in program), storage facility for laundry supplies, and a sink (if proximity to a sink is not allowed in total planning).

Hospitality or home living area: Commonly has multiple use. It may include activities in home furnishing, hospitality, child care, home nursing, care of the home, and audio-visual presentations. Special equipment may include:

1. Dining table and chairs.
2. Comfortable semi-upholstered chairs.
3. Small table.
4. Decorator lamp.
5. Carpeting.
6. Storage for a roll-a-way bed and bedding, folding tables and chairs, play equipment and supplies, and easels for child care, home nursing supplies, room cleaning supplies—vacuum, etc., extra dishes, linens, etc., home furnishing supplies.
7. Audio-visual projection equipment.

These is no doubt that the adequacy and arrangement of the equipment are essential to the development of a good, varied program in homemaking. Most important, however, is the creative, enthusiastic, well trained teacher who can implement this equipment in offering a well organized, student-inspired, community-approved program to accomplish the all-over objectives as set forth in the school's educational philosophy.

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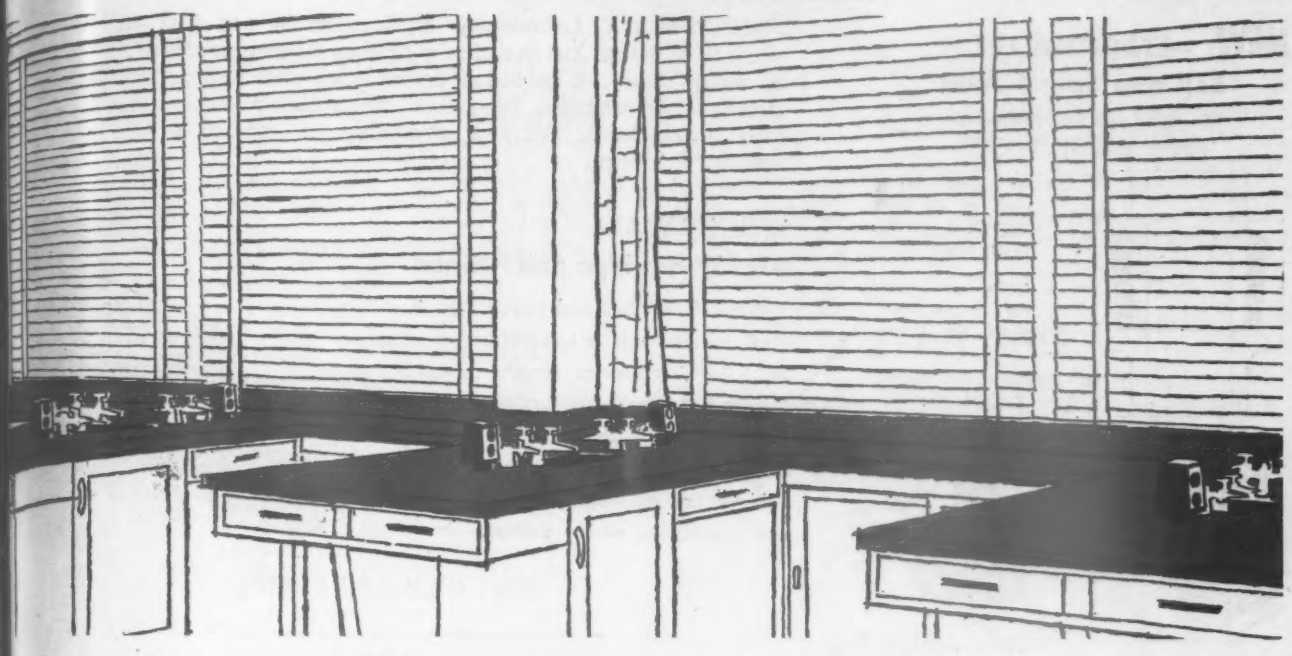

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ractive appearance. You can *decorate* your school laboratory, ghten it and make it a more attractive place in which to work with olorlith's choice of three beautiful colors—rich Cameo Brown; light d Surf Green; and handsome Charcoal Gray.

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onger than stone . . . resists heat and shock. Combining im- ssive tensile, shear and compressive strengths, Colorlith resists re than ordinary laboratory abuse. Because of its exceptional ctural strength, it is available in 4' x 8' sheets in thicknesses m 1¼" to ¼". The thinner thicknesses lend themselves ideally to construction of matching or contrasting colored fume hoods . . . are suitable for resurfacing old laboratory table tops. Colorlith is readily machined with metal-working tools.

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TYPICAL PHYSICAL PROPERTIES*

Density (Dry), lb/cu ft min	100
Moisture Content (Normal), % dry wt, max	4
Water Absorption, % of dry wt max (After 48 hrs immersion at room temperature, vinyl coating all sides)	Less than 2
Modulus of Rupture, psi	
¼" thickness	5000
¾" thickness	4500
1¼" thickness	4000
Compressive Strength (Normal), psi	15000
Brinell Hardness No. (Dry) 500 kg load, 10 mm ball, 10 sec	25

*The figures given are average values (unless otherwise specified) obtained in accordance with accepted test methods. "Dry" refers to oven-dried samples; "Normal" to normal conditions of 75F and 50% R.H.

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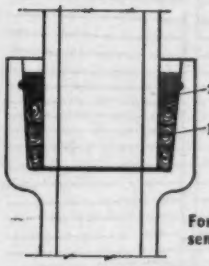
Manufacturers of Acid-Proof Laboratory Equipment

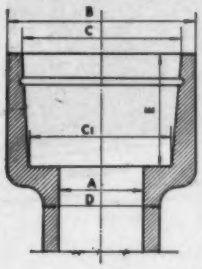
NEW —KNIGHT-WARE Bell and Spigot Joint

Uses Lead and Acid-Proof Rope Assures Leak-Free Operation



1. At least three rings of KNIGHT No. 2642 Acid-Proof Rope.
2. Lead wool on top of the rope about ¼" thick.

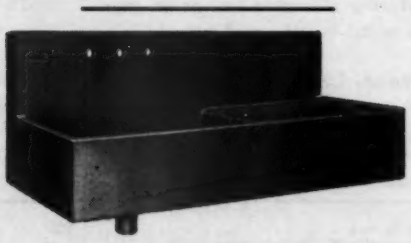
For Complete Instructions send for Bulletin No. 1813



269A—P Trap with flange clean out

271—Bell and Spigot Pipe

A In.	B In.	C In.	D In.	E In.	Feet Length	Wt. -Lbs. 5'0" Lgth.
1½	3⅛	3	2¼	2½	1-5	17
2	4⅛	3½	2¾	2½	1-5	22
3	5¾	4¾	4	2½	1-5	32
4	7⅛	6	5	2½	1-5	44
5	8¾	7½	6	3	1-5	60
6	9¾	8½	7¼	3	1-6	76
8	12¼	11	9½	3	1-6	110
10	15½	14	11¾	3	1-6	176
12	18	16	13¾	3	1-6	206



No. 237-RD

KNIGHT-WARE sinks are available with right, lefthand or double drainboards.

KNIGHT-WARE Laboratory Equipment is not just surface resistant but genuinely acid-proof throughout its entire body. It includes drain lines and fittings, sinks, table troughs, receptors, neutralizing sumps and fume ducts. All are available in special or standard design.

KNIGHT-WARE Acid Waste-Pipe and Fittings

KNIGHT-WARE Bell and Spigot Pipe and Fittings are available in bores of from 1½" up to 60". Usual maximum lengths are 5'0" although 6'0" lengths are furnished on occasion. Special combination fittings for unusual conditions or to eliminate unnecessary joints can be furnished. We also supply flanged or plain end connections where desired.

KNIGHT-WARE SUMPS

		401-B		400-A	
Inside diameter	12	18"	24"	30"	36"
Inside depth	12	24"	36"	57"	75"
Connections	2	3-4"	3-4"	4-6"	4-6"
Net weight lbs.	75	175	400	700	1100

We fabricate two types of KNIGHT-WARE Sumps or Dilution Basins. The smaller Type "B" will service small installations from 1 to 20 Sinks while the larger Type "A" will handle installations up to 100 Sinks. Standard designs have a single inlet and luted outlet connection at 180°. A vent connection is standard in sizes above the 12" diameter. Additional connections are available if needed and changes in position and elevation of the connections can be made at no increased cost. Covers for the "B" Type are usually flat and flanged and provided with bolts and gaskets. Covers for the "A" Types are set in a socket on a ring gasket but flanged covers can be provided for the "A" Type at slightly increased costs.

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KNIGHT-WARE Laboratory Sinks are custom built to suit your requirements. Because they are entirely handmade, it costs no more for this service. The one-piece construction, smooth surfaces, rounded corners and acid-proof quality mean a freedom from leaks and a cleanliness that is permanent. Outlets of various designs, back, drainboards and apron are optional as an integral part of sink. Special designs and sizes other than those listed in our catalog are available. In this case please submit sketches and complete dimensions when requesting quotations.

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		W.	HT.	D.	W.	HT.	D.
MR-14B	2000°	14	14	14	39½	31¼	24
MRH-14B	2300°	14	14	14	39½	31¼	24
MR-16C	2000°	15½	16½	15	29½	60	26
MRH-16C	2300°	15½	16½	15	29½	60	26
MR-19C	2000°	19	19	19	33	65	30
MRH-19C	2300°	19	19	19	33	65	30

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Silicon carbide heating elements give uniform clean heat up to 2800° F. for steady service, intermittent to 3000° F. Standard models include temperature controller, transformer, switchgear, blower . . . special instrumentation to meet your needs.

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NMR- 7	7	9	9	23	62½	27	5 KVA
NMR-10	10	11	13	32	68	33	10 KVA
NMR-12	12	12	17	35	72	40	15 KVA
NMR-15	15	18	20	41	72	43	15 KVA
NMR-20	20	27	27	49	78	51	20 KVA**
NMR-36	36	45	41	70	84	69	45 KVA**

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**Large sizes, 3 phase standard

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MODEL NO.	MAX. TEMP. F.	FIRING CHAMBER			OUTSIDE DIM.		
		W.	HT.	D.	W.	HT.	D.
MR-10A	2000°	12	10	12	20	20	20
MR-15A	2000°	18	15	18	28	26	28
MRH-15A	2300°	18	15	18	28	26	28
MRH-18A	2300°	18	19½	18	28	34	28

SIDE-LOADING . . . Bench Models

MR Series for Cone 04 (2000° F.)
MRH Series for Cone 8 (2300° F.)

MODEL NO.	MAX. TEMP. F.	FIRING CHAMBER			OUTSIDE DIM.		
		W.	HT.	D.	W.	HT.	D.
MR- 9B	2000°	7½	11	8½	17	22	18
MRH- 9B	2300°	7½	11	8½	17	22	18
MR-11B	2000°	12	11	14	25	26	25

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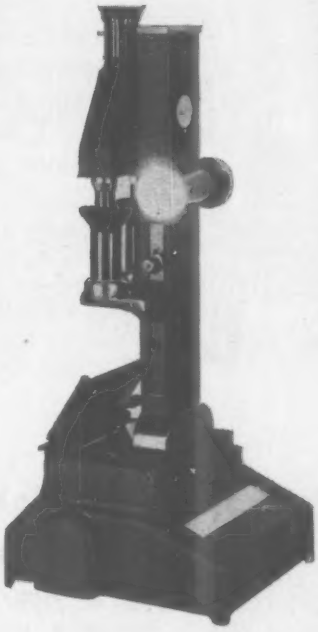
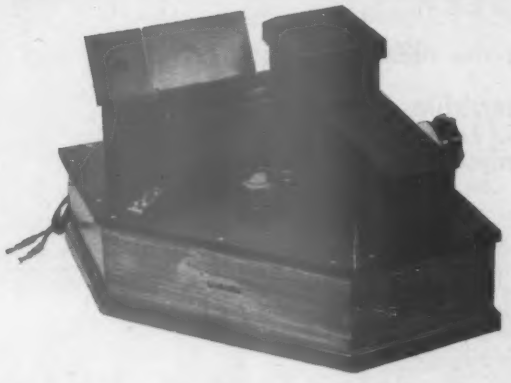


The Klett Fluorimeter



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Has all of the BASIC FEATURES plus: 110 volt three-wire cord on UL approved automatic retracting reel. Easy-to-remove, heavy-gauge stainless steel basin. Readily accessible grounded electrical outlet. Efficient dependable laboratory pump provides immediate supply of water from water reservoir in rear of cabinet.

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MODEL W $314.00

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APPARATUS NO. 612 . . . . . $53.00

The MOBILAB may be purchased complete with a manual of 144 experiments and a comprehensive coverage of equipment in excess of 130 pieces.

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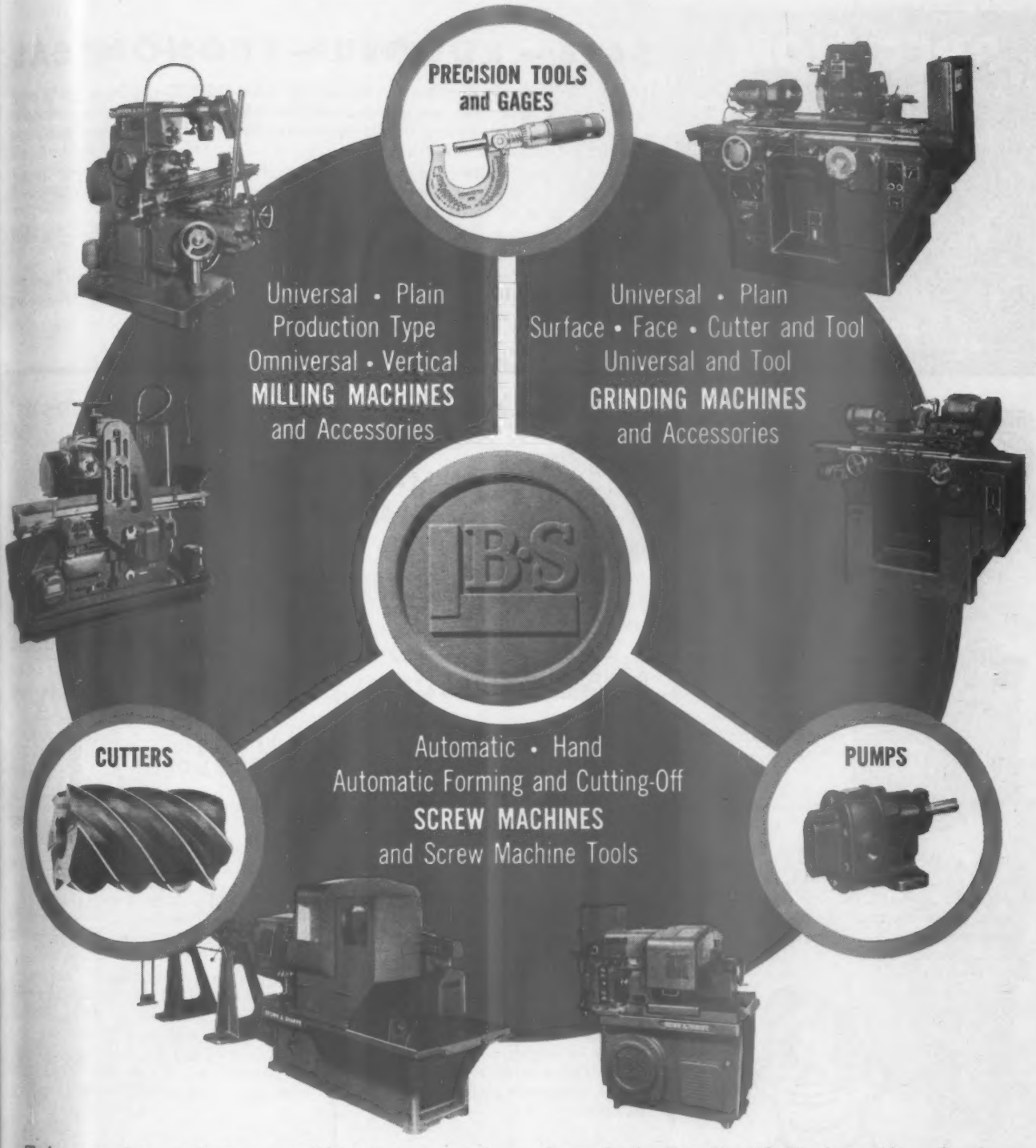


Train your shop students on machines that are used throughout industry to set the highest standards for precision, productivity, and versatility — in the toolroom, on the production line. Simplified basic machines of each type are available which permit full instruction in modern metalworking methods. Write for complete information.

Brown & Sharpe PRECISION CENTER

ATLAS PRESS COMPANY

5312 North Pitcher St., Kalamazoo, Mich.

PRECISION TOOLS by Atlas and CLAUSING

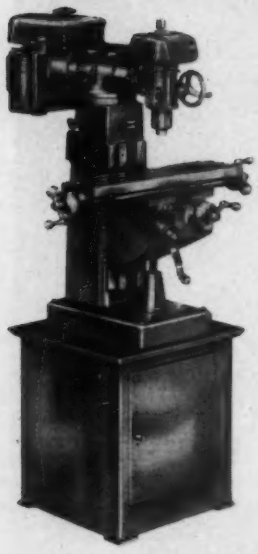
SAFE — RUGGED — ECONOMICAL

There are many reasons why ATLAS and CLAUSING machine tools meet school needs best: They set the standard for safety. Each has many exclusive easy-operating features that enable students to learn machining principles *faster* . . . and with less supervision.

They're ruggedly built to stand up under inexpert student use — their quality construction will win commendation from those who expect you to buy tools for many years of accurate service.

And, they enable you to buy more equipment per dollar invested, to give more students the opportunity to get adequate operational experience.

When you plan for shop expansion or tool replacement, make sure you have the latest ATLAS-CLAUSING catalogs as a guide in determining your recommendations and requisitions.



CLAUSING VERTICAL MILLER

Mills, drills, bores, reams and shapes — at all angles — with one setup! 6" x 24" table, high precision spindle head, 3" quill travel. As easy to set up and operate as a drill press.

CLAUSING HEAVY-DUTY DRILL PRESSES with POSITIVE POWER VARIABLE or 5-SPEED DRIVES

20"

FLOOR MODELS

Has machined and balanced pulleys, lubricated-for-life bearings, and ground steel column, table, and base. Positive-power variable drive models offer speed ranges from 150-2000 RPM — student dials any speed within given range while drill is running. Step pulley Models with 5 or 10 speeds have ranges from 150-2000 RPM. Factory-tested, wired, and ready-to-run with motor and switch installed.

15"

BENCH and FLOOR MODELS

Way ahead in any comparison you could make. Positive-power variable drive models offer speed ranges from 500-4500 RPM — speeds are dialed while drill is running. 5-speed drill has range from 410-5380 RPM. Has machined and balanced pulleys, lubricated-for-life bearings, 3" dia. ground steel column, big table and base. Factory-tested, wired, and ready-to-run with motor and switch installed.

ALL UNITS *ready to run*

363A

SAFETY SAM SAYS:

SEND FOR CATALOGS, and Information On TEACHING AIDS

ATLAS PRESS COMPANY

5312 North Pitcher St., Kalamazoo, Mich.

...and HERE'S PROOF!

"My eight Clausing 6328 Lathes are the finest lathes for instructional use I have ever seen. Their safety features, ruggedness and ease of operation make them tops in their field. They offer so many more features than any other lathe that I would vote for a Clausing every time."—Harold Burgan, Spokane, Washington.
"Clausing vertical mills are the easiest to set up and operate of any mills . . . and are ideal, too, for school shop training because they provide valuable experience in so many different machining operations. They are rugged, accurate . . . real values." C. J. Harper, Hillside High School, Hillside, N.J.
"Clausing drills are the best values we've seen for school shop use." John Bendix, Western Michigan University.
Make your own comparisons . . . write for catalogs today.

363 B

CLAUSING HEAVY-DUTY PRECISION LATHES

12¾" Swing Over Bed

5400 - Series

12¾" swing over bed — 1⅜" bore. 2¼" - 8 threaded spindle nose or L-00, optional. Double-walled apron, oil bath lubrication. Flame hardened bed ways. Timken "Zero Precision" tapered roller bearings. Underneath drive, with choice of variable speed countershaft or 10-speed countershaft — with clutch and brake optional — one or two-speed motors.

6300 - Series

12¾" swing over bed — 1⅜" bore. ASA — L-00 spindle nose. Enclosed headstock, apron, quick-change box — all with oil bath lubrication. Flame hardened bed ways. Timken "Zero Precision" tapered roller bearings. Underneath drive, with choice of variable speed countershaft or 10-speed countershaft — with clutch and brake optional — one or two-speed motors. Outboard spindle drive pulley.

Atlas 12" METAL LATHE

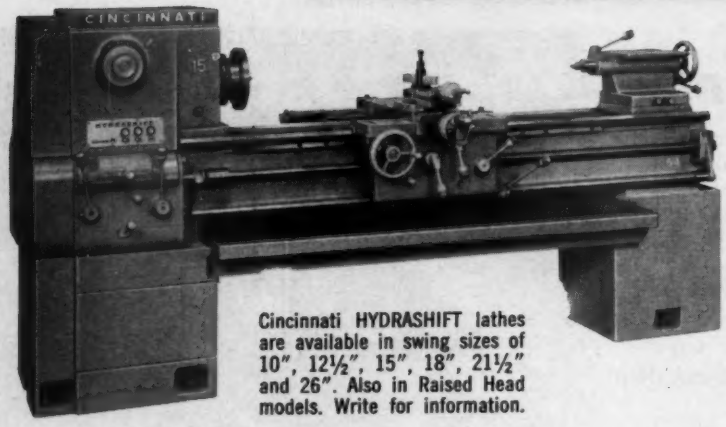
A big capacity lathe with these important features, standard equipment: Timken tapered roller bearings, 16 speeds, reversible power cross and longitudinal feeds, wide thread cutting range, V-belt drive. Available in bench models, and in underneath drive models with pedestal base. Investigate before you buy any lathe.

CLAUSING-COLCHESTER 13" HEAVY-DUTY GEARED-HEAD LATHE

13" swing over bed. 1 1/16" hole thru spindle. L-0 spindle nose, taper key drive. Tapered roller bearings with oil flow lubrication. Induction hardened bed ways. Headstock and quick-change gears run in bath of oil. Available with 24" or 36" between centers, and in gap bed model with 18" swing in gap.

CINCINNATI LATHE AND TOOL CO.

Cincinnati 9, Ohio



Cincinnati HYDRASHIFT lathes are available in swing sizes of 10", 12½", 15", 18", 21½" and 26". Also in Raised Head models. Write for information.

LATHES . . .

New HYDRASHIFT has Power Dial Speed Shifting

More than ever the best buy in the economy-priced geared head lathe field, Cincinnati now offers the new HYDRASHIFT® line . . . greater efficiency, greater safety, greater durability, greater convenience. Selection of 12 spindle speeds is by setting a dial. Hydraulic power does the shifting. It's safer for the machine and the operator. Designed and built for profit-making performance in industry, HYDRASHIFT lathes are ideal for training profit-making operators.

TRAIN THEM ON Cincinnati

SAFE • ACCURATE • DURABLE • ECONOMY-PRICED

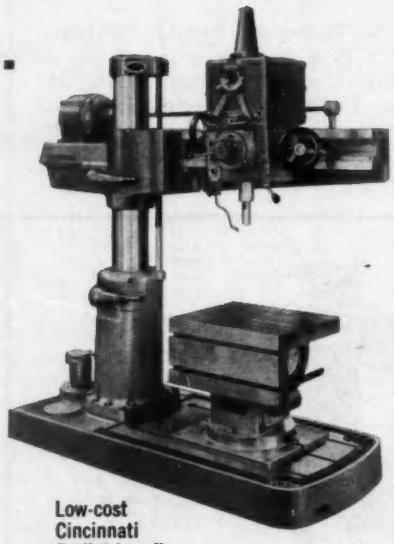
DRILLING MACHINES...

Cincinnati builds a full line of drilling machines: medium and heavy duty Sliding Head Drills; Stationary Head Drills; light duty ROYAL Drills; medium duty Radial Drills.

ROYAL DRILLS are low-priced real machine tools—light duty, sensitive models for metal or wood. Built in 16" and 18" bench and floor types, the ROYAL has four-bearing spindle mounting for sustained accuracy in long, hard usage. Designed for operator ease and safety—in training shop as well as in industry.

RADIAL DRILL has 3' arm, 7½" column with 1¼" capacity in cast iron. The all-geared head provides 9 spindle speeds; all shafts are mounted on antifriction bearings; column mounted on tapered roller bearings; full automatic pressure lubrication; heavy-ribbed base with built-in coolant tank.

Write for full information.



Low-cost Cincinnati Radial is a fine production tool, too.

Royal Drills are built in 16" and 18" bench and floor models.

THE TOOLS THAT INDUSTRY USES!

DURO METAL PRODUCTS COMPANY

POWER TOOL DIVISION

2651 N. Kildare Avenue, Dept. 23, Chicago 39, Illinois

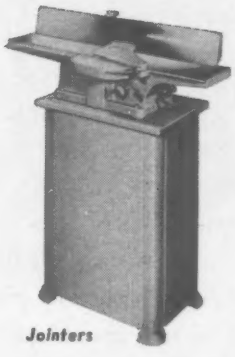
The World's Largest Manufacturers of Power and Hand Tools (Duro-Chrome)

"Built-in Extras" make

DURO POWER TOOLS

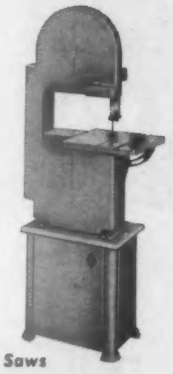
the most desired line in schools everywhere!

Scroll Saws

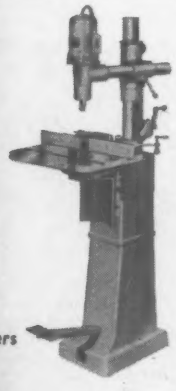


Jointers

Sanders



Band Saws



Routers

Lathes

Drill Presses

Circular Saws

- **extra work areas**
- **extra capacities**
- **extra safety features**
- **extra ruggedness**

Progressive school administrators are equipping their vocational workshops with Duro Power Tools. The reasons for this preference are many and varied—but it can be boiled down to three simple words—"more for less"! You need just glance at a Duro unit to see the many extras you get at no extra cost! Here are just a few: *Circular Saws* have larger tables, greater depth of cut at 45° and 90°, added work space ... PLUS ... *Drill Presses* with more capacity and stroke feed, a built-in light and switch ... PLUS ... *Lathes* offer 2" greater swing over bed, handwheels for tail stock and tool rest holder ... PLUS ... *Band Saws,* too, have 2" more capacity under foot, 104" blade, table extensions and light attachment ... PLUS ... *Belt and Disc Sanders* with miter gauge included, quick belt release, extra large platen size ... PLUS ...

These extras are only a few of the many found on the entire Duro line ... extras not found on other nationally advertised power tools.

There are many other advantages in owning Duro too—you get advanced design, lifetime ruggedness, precision accuracy, high operating efficiency and practically no maintenance cost. If you're looking for value and utility in power tools, choose DURO—it's your best bet!

Get this FREE Catalog

Write today for your copy of the big Duro Catalog showing the complete line. You'll get a closer look at the many "built-in" extras that make this line "second to none." Write today.

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio

FILMATIC®

Builders of fine machine tools: milling; grinding; broaching; electrical machining; die sinking; cutter and tool grinding; production lines; metal forming. Hardening machines.

CINCINNATI

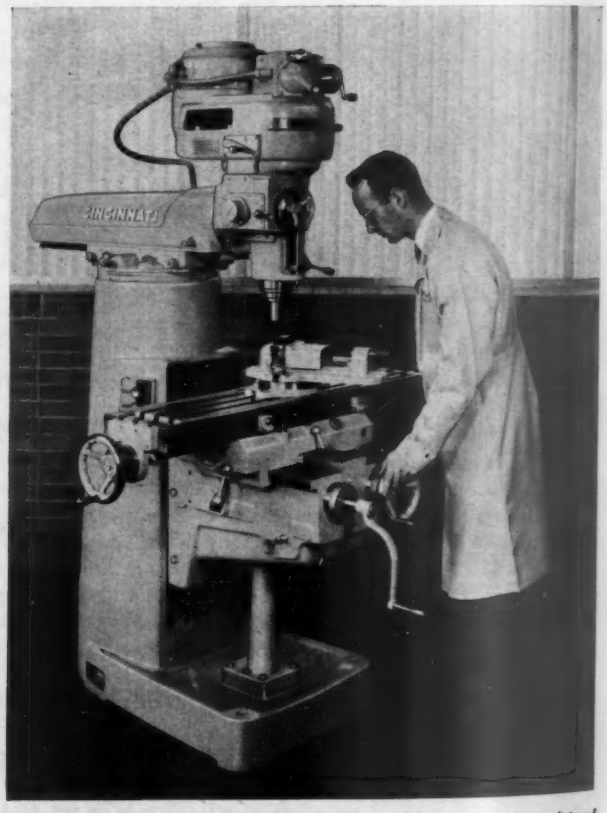
CINCINNATI MACHINES built for Industry are TOPS for Training too

Your machine shop boys are best prepared for the job when they are trained on equipment actually used in industry. With machine tools built by Cincinnati you provide this valuable experience, and ensure ease and safety of operation. In addition, Cincinnati's extremely wide variety of attachments provides the versatility you must have in your shop.

Training aids are available to instructors without charge, except quantities of educational booklets, which are nominally priced. Our leaflet "Educational Aids" giving full details, will be sent upon request.

CINCINNATI
No. 203-10ML
Plain Milling Machine
Table travel . . . . 28″
Cross travel . . . . 10″
Spindle drive . . . 3 hp

CINCINNATI Knee-Type Milling Machines are accurate, versatile, easy to operate. Available in Plain, Universal and Vertical styles. Illustrated is a Universal machine setup using the CINCINNATI Dividing Head for milling of gear teeth. Catalog No. M-1995-5.



CINCINNATI Toolmaster Milling Machine. Handles a wide variety of light milling operations within 1 or 2 hp range. Table travel, 22″; cross travel, 10″. Attachments include Shaping, Vises, Index Head. Catalog No. M-2110.

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 10" Hydraulic Universal Grinder. A precision cylindrical grinding machine for both external and internal work, including taper, face and angle grinding setups. Many attachments available. Catalog No. G-737.

Educational Booklets

A wealth of basic and practical information for machine shop instructors. **Single copies free.**

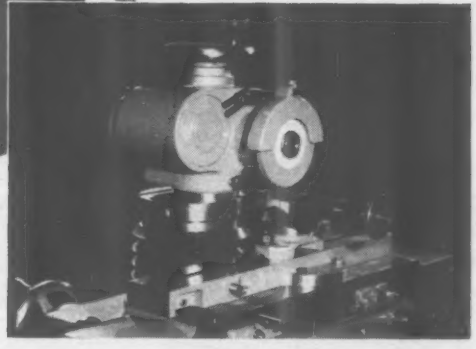
Milling Machine Practice . . . . **No. M-773-1**

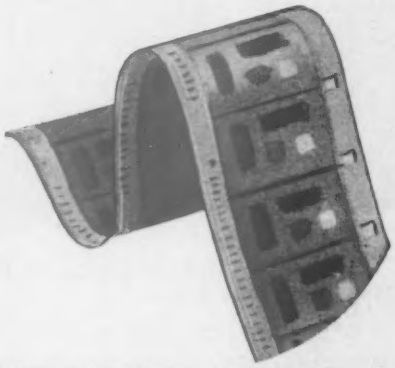
Cutting Gear Teeth on a Milling Machine . . . . . **No. M-1769-1**

Principles of Centerless Grinding . . . . . **No. G-503-2**

Instruction Charts (not illustrated). Principal units and operating controls, shown on 22" x 34" charts. Most desirable for lecture courses are: Toolmaster Milling Machine; Nos. 203-10ML and 205-10MI Milling Machines; No. 1 Cutter and Tool Grinder.

CINCINNATI No. 1 Cutter and Tool Grinder. For grinding a variety of small cutters. Attachments available for radius grinding, small end-mill grinding, surface grinding (see photo below), internal grinding, etc. 8" swing over table, 10" table travel, cross traverse 4½". Catalog M-1852-4.





16mm Color Movies. For greater appreciation of the machine tool and metalworking industries, although not intended specifically as training aids. Write for booking dates on any of the following:

"Highway to Production"

"Age of Precision"

"Cool Chips"

"One Hoe for Kalabo"

LOGAN ENGINEERING CO.

4901 W. Lawrence Ave., Chicago 30, Ill.

NEW!

Logan

14" LATHES
BEST DOLLAR VALUE
IN THE LATHE FIELD

These new Logan 14″ swing lathes are **DEPENDABLE.** Their capacity permits a broad range of machining operations. They have a 14⅝″ swing over bed, a swing over saddle cross slide of 9″, and a center distance of 28″. Logan lathes are **ACCURATE.** The ball bearing spindle has a 1⅜″ hole and a draw in collet capacity of 1 1/16″. The variable speed drive (40 to 1400 RPM) adjusts while lathe is running—no need to stop and shift belts! Also, the two V-ways and flat ways of the lathe are precision ground. Logan 14″ swing lathes are **RUGGED.** The 10″ wide and 56″ long lathe beds are braced by oversize ribs to withstand torsional stresses. Feature for feature, the Logan 14″ lathe is your best dollar value. The proof's in the product. No other lathe in this price category offers you this same big work capacity with variable speed drive. Write today for complete specifications.

Model 6510
$1,775.00
F.O.B. factory

Logan

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THE LUFKIN RULE COMPANY

Saginaw, Michigan • Middletown, N. Y. • Barrie, Ont.

Why Lufkin is the new leader in precision tools

It took years of intensive research, not only of metals and materials, but of the needs and frustrations of master machinists, instructors and students.

It took ingenious tool designs to make tools easier to handle, easier to read, provide greater accuracy.

It took new standards of craftsmanship to turn out tools that provide longer life and dependability.

But Lufkin did it—with a complete line of precision tools loaded with exclusive features—features that make them more desirable in every way for instructors and pupils alike. Features that will help you and your students meet the technological challenge of the '60s.

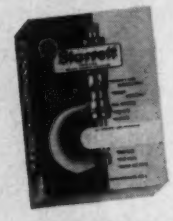
Your industrial distributor knows precision tools and can show you how Lufkin leads in design and craftsmanship. And his stock is maintained to fit your needs. Lufkin, Saginaw, Mich.

THE L. S. STARRETT CO.

Dept. SU, Athol, Massachusetts, U.S.A.

Starrett TOOLS

• PRECISION MEASURING TOOLS



New catalog No. 27 shows a complete line of Starrett Tools priced to fit school budgets. Write for your free copy.

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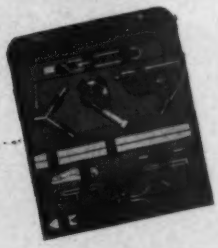

The essential measuring tools needed for modern shop projects . . . in compact, convenient kits—easy to issue, carry and store.

• STEEL TAPES AND STEEL RULES

Quick-reading steel tapes and no-glare *Satin-Chrome* steel rules pioneered by Starrett for fast accurate measuring.

• HACKSAWS, BAND SAWS, HOLE SAWS

Power and hand hacksaw blades; band saws and hole saws for cutting metal, wood, plastics . . . precision made by Starrett to cut faster, last longer.

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An authoritative handbook on tools, machines and modern shop methods. Written in clear, simple shop language. Profusely illustrated, completely indexed. $1.60 per copy.

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Fifteen blue-print-type tool charts available in wall size for instructors (free) and in notebook size for students (25 cents per set).

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Precision measuring from basic rules to latest precision methods in 30 interest-packed minutes. Loaned without charge to vocational schools. Arrange for a free showing.

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MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS
DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK
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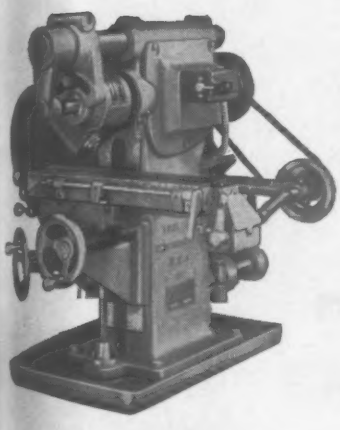
U. S. BURKE MACHINE TOOL DIV.
35 Brotherton Road, Cincinnati 27, Ohio

Designed to Teach Basic Machining Skills with Minimum Investment

- Perform All Standard Milling Operations
- Simple Operation Increases Value as Instructive Aid . . . Permits Practical Shop Teaching
- Within Cost Range of School Shops
- Accuracy Certified, Rigidly Built



BURKE
Bench Millers

No. 1 & No. 3 Hand Feed Models

TABLE: Working surface: 3½" x 12" or 3¾" x 16"

RANGE: Longitudinal feed: 8" or 12"; cross feed: 3⅜"; vertical feed: 4½" or 7½"

SPINDLE: #9 B & S taper; speeds: selective from 66-5000 RPMs

DRIVE: ½, ¾ or 1 H.P. motor

NET WEIGHT: #1 — 300 lbs., #3 — 350 lbs. (approx.)

No. 4 & No. 4 Universal Power Feed Models

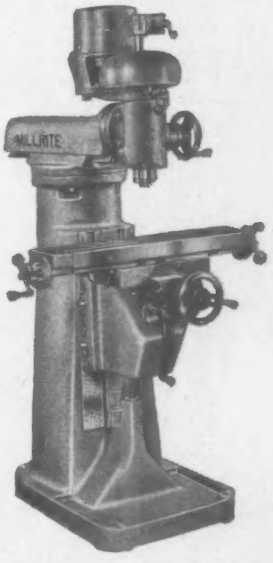
TABLE: Working surface: 3¾" x 16" or 3¾" x 20"

RANGE: Longitudinal feed: to 12"; cross feed: 3⅜"; vertical feed: 7" or 8"

SPINDLE: #9 B & S taper; speeds: selective from 66-5000 RPMs

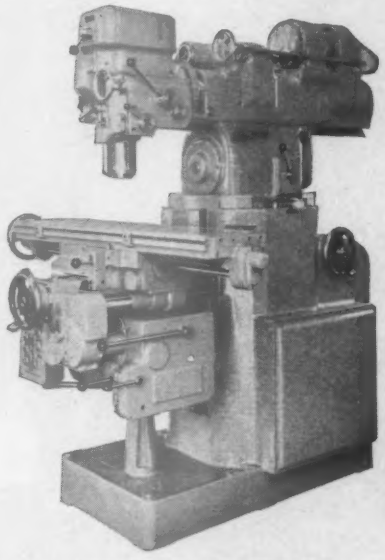
DRIVE: ½, ¾ or 1 H.P. motor

NET WEIGHT: 450 or 500 lbs. (approx.)



NEW U.S. MILLRITE
Large capacity!
Low price!

The MILLRITE, a full-size dovetail ram and turret vertical milling machine, is ruggedly and accurately built to accepted machine tool tolerances. Yet, it is designed to sell for less than $1000. Highly productive for precision milling and boring operations.



U. S. QUARTET
MILL 4 WAYS ON 1 MACHINE

- Vertical
- Angular
- Horizontal
- Universal
- Quick changeover.
- Turret holds horizontal spindle; separately powered vertical head mounted on overarm.
- Turret swivels for universal operation.
- Powerfeed to saddle and table.
- Working surface, 48" x 10".
- 29½" longitudinal feed, 11" cross, 16¼" vertical.

Write for full information and quotation.

FREE: New 16-page instructor's manual on the operation and construction of vertical milling machines. Write for a copy.

SINGER SEWING MACHINE CO.

149 Broadway, New York, N. Y.

Why the SLANT-O-MATIC is a big hit with teachers

Today, half of all machines bought by homemakers are zig-zag machines. It's the big trend . . . and growing!

Now's the time for students to learn the new zig-zag techniques they'll use in the future—how to overcast, blind-stitch hems, make buttonholes, sew on buttons, and how to handle jerseys and tricots.

Zig-zag sewing is simple to master, and easy to teach, on the classroom-sturdy SLANT-O-MATIC* #401 machine. Made in America by SINGER, the only company which makes household zig-zag machines in the U. S.

Time-saving and decorative zig-zag stitch patterns are selected by "tuning" the dial. The stitch chart and threading charts are *printed on the machine.* Most parts and accessories are interchangeable with the #404 straight-stitch Slant-Needle Deluxe.

A word about service. On request, a SINGER repair man will clean, oil and make simple adjustments to SINGER classroom machines, free of charge. Another reason SINGER* machines are classroom favorites!

SINGER SEWING CENTERS

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SUPERIOR QUALITY

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Laboratory Furniture & Equipment

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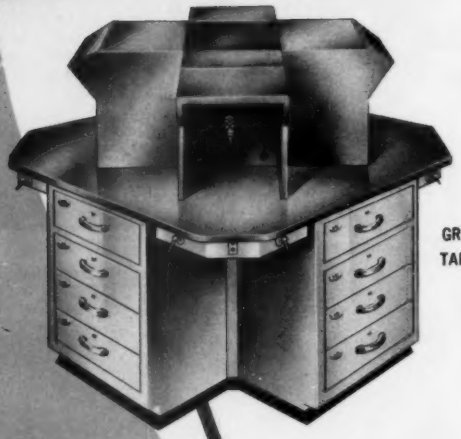
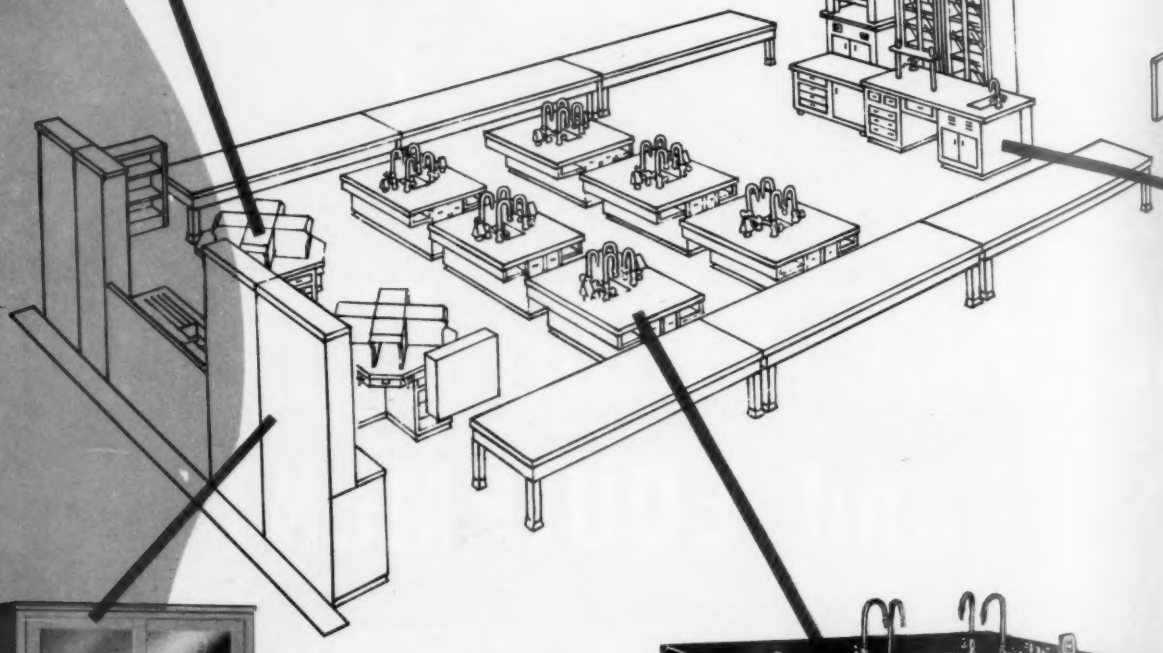
Custom Labs to suit your needs! . . .



GROUP PROJECT
TABLE GPT-105

HOOD SCHC-49



STORAGE & DISPLAY
CASE CSC-984

COMBINATION SCIENCE TABLE CSC-103

DESIGNED WITH THE FUTURE IN MIND - - - -

FIREPROOF —

Rugged lead coated sheet steel construction

VERSATILE —

Engineering affords maximum performance utilization and laboratory arrangement

ECONOMICAL —

In installation and maintenance

FLEXIBLE —

Functional and operational

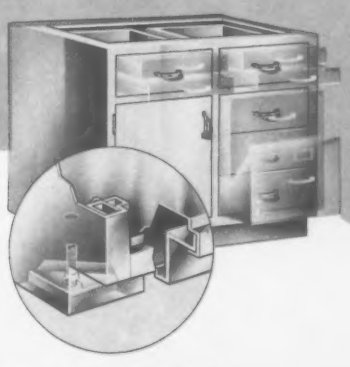
DURABLE —

Highly Acid, Alkali and Temperature resistant

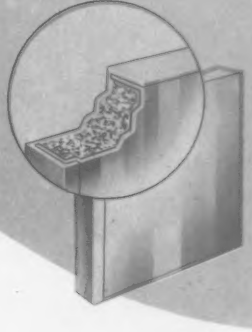
INSTRUCTORS DESK ED-100

DURALAB SUPERIOR FEATURES GIVES GREATER VALUE AND GREATER PERFORMANCE

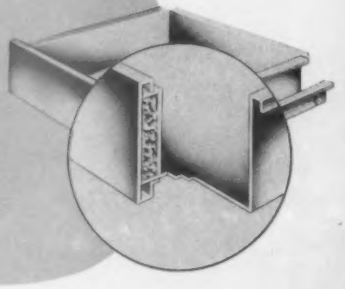
- LEAD COATED SHEET STEEL
- Rugged Precision Construction
- Dual Welded Interlocking Joints
- Integral Adjacent Components
- Double Wall Constructed Drawer Heads and Doors, Sound Deadened
- Baked-on Acid, Alkali and Solvent Resistant Finishes
- Quiet Operation
- Waterproof
- Easy Accessibility
- Fireproof
- Corrosion Resistant
- Functional



Cross section showing Corner Construction and patented leveling device.



Cross section of Door Construction



Cross section or Drawer Construction

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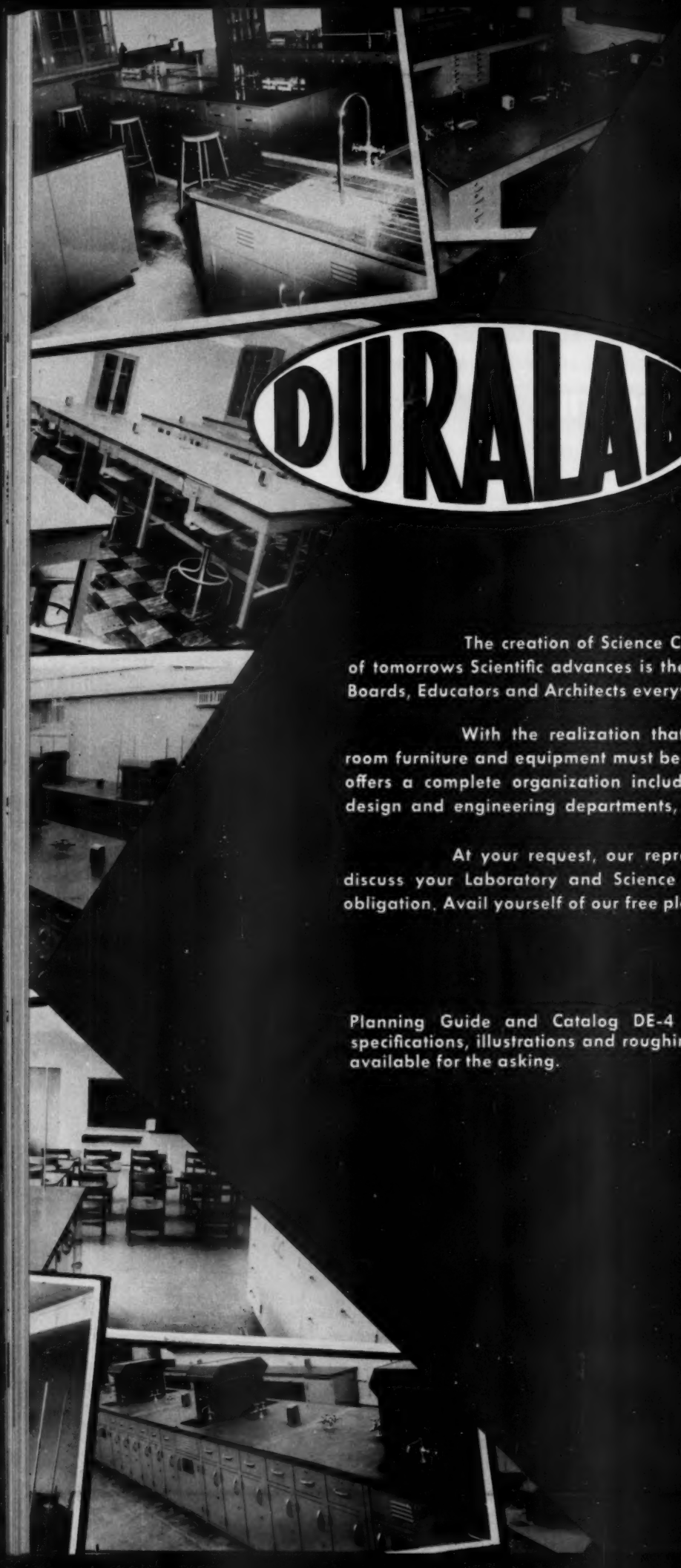
987 LINWOOD STREET, BROOKLYN 8, N. Y.

Manufacturers and Designers of Laboratory Furniture & Equipment



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BROOKLYN 8, N. Y.

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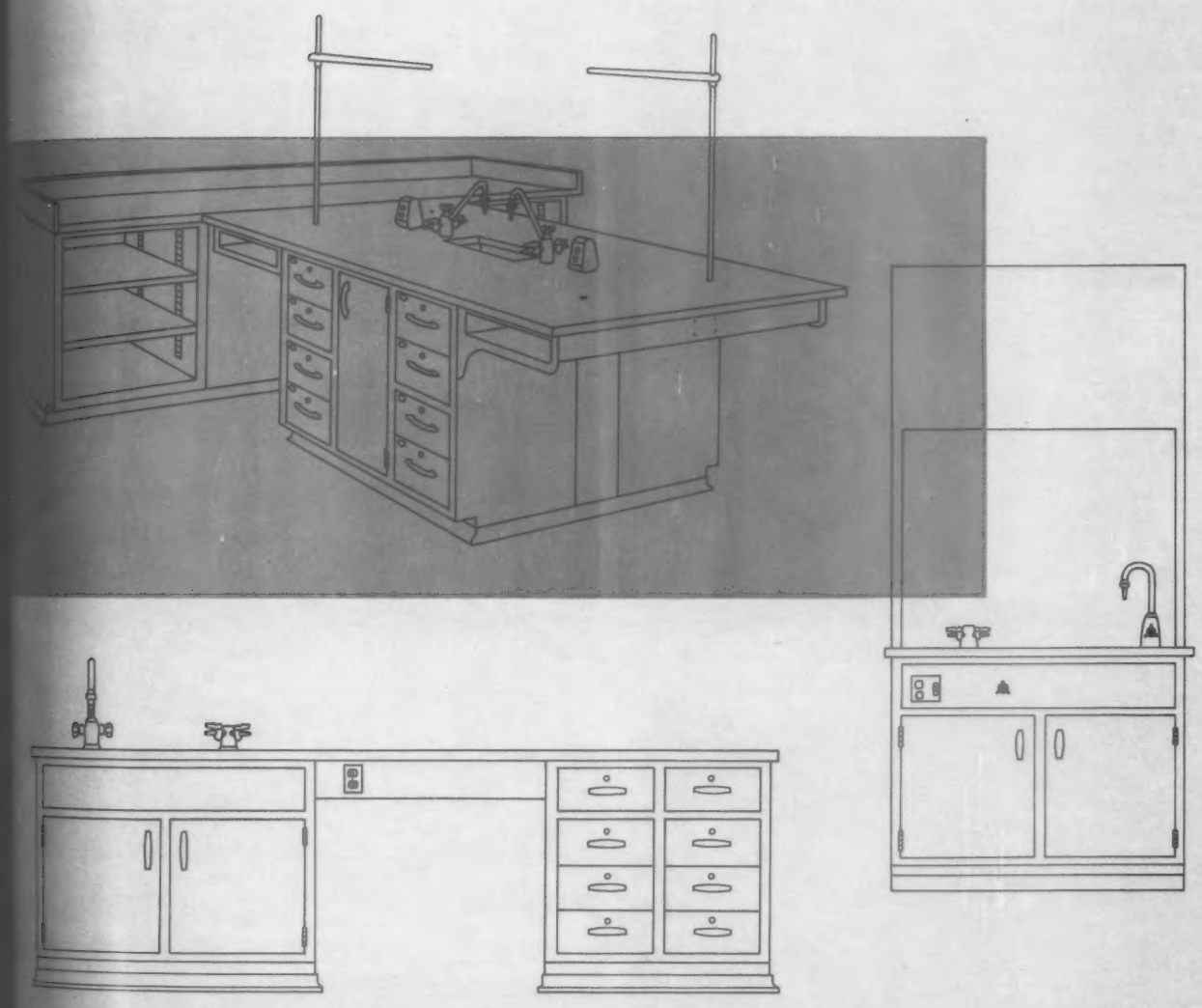
for schools and colleges



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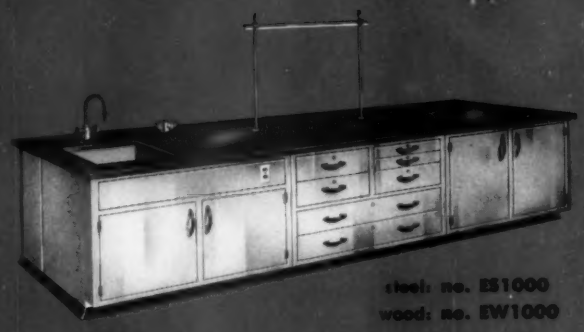
WOODLAB®

LABORATORY FURNITURE CO., INC.
Old Country Road • Mineola, New York

demonstration tables

fixed tables



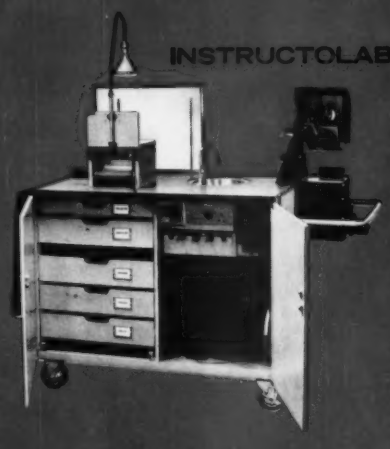
steel: no. ES1000
wood: no. EW1000

width 30", height 37"

length, feet	catalog number	
	steel	wood
12	ES1000	EW1000
10	ES1040	EW1040
8	ES1030	EW1030
6	ES1020	EW1020
5	ES1010	EW1010

standard equipment: 1 combination hot and cold water faucet; 1 duplex A.C. receptacle; 1 double gas cock; 2 burette rods, cross arm, clamps and flush receptacles; 1 set of lead drain fittings.

portable tables



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Fully equipped with ACT-O-MATIC Dual-Position Projector, light stage, safety shield, 5 gases, water, Lab-Volt, vacuum pump, demonstration manuals and all apparatus and supplies for chemistry, physics and biology.
length 48", width 29", height 37"

All-C™-Fume Hood

Portable fume hood complete with its own water, gas and electric. Offers full visibility to all students.
length 38½", width 24½", height 68½"

steel: no. ES1050
wood: no. EW1050

standard model 1060
Complete with water, electric and burette rods.
length 48", width 28", height 36¾"

steel: no. ES1060
wood: no. EW1060

Economy model also available, using plastic tote trays in place of drawers. steel: no. ES1061, wood: no EW1061.

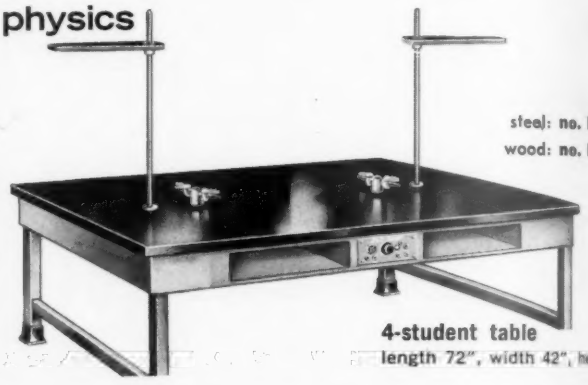
secondary and high school

chemistry

steel: no. ES604
wood: no. EW60

4-student table
length 72", width 48", height 3

physics



steel: no. ES304
wood: no. EW30

4-student table
length 72", width 42", height 3

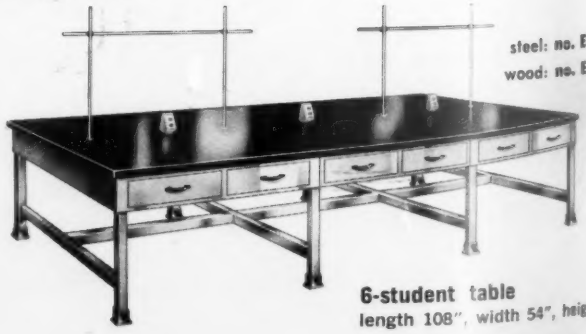
college and advanced science

general chemistry

steel: no. ESC12
wood: no. EWC1

8-student table
length (except sink) 143", width 54", height 3

physics



steel: no. ESP12
wood: no. EWP1

6-student table
length 108", width 54", height 3

NOTE: All illustrations and dimensions shown are for steel units. The same units utilizing wood construction may vary slightly.

STEELAB • WOODLAB

chemistry

steel: **no. ES618FA**
wood: **no. EW618FA**

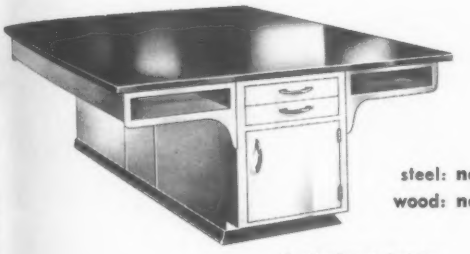
8-student table
length (except sink) 143", width 54", height 37"

multi-purpose "perimeter"

4-student table
length of wall counter 90"
width from wall to end of table 90"
height 37"

steel: **no. ES7006**
wood: **no. EW7006**

biology



steel: **no. ES5041**
wood: **no. EW5041**

4-student table
length 60", width 42", height 31"

multi-purpose "Clearview" ™

steel: **no. ES904**
wood: **no. EW904**

4-student table
length 48", width 48", height 37"

organic chemistry

steel: **no. ESC52**
wood: **no. EWC52**

8-student table
length (except sink) 143", width 54", height 37"

physical chemistry

steel: **no. ESC22**
wood: **no. EWC22**

8-student table
length 191", width 54", height 37"

biology

steel: **no. ESB32**
wood: **no. EWB32**

8-student table
length (except sink) 158", width 54", height 31"

geology

steel: **no. ESG12**
wood: **no. EWG12**

8-student table
length 181", width 54", height 31"

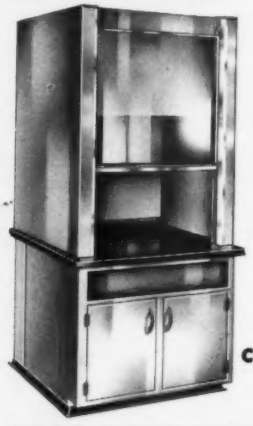
general laboratory equipment

storage cabinets

Base cabinets and wall or counter top cabinets

floor units

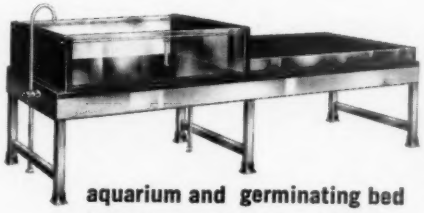
fume hoods



CUT-5

A complete line of fume hoods are available in either the open type or closed type. Special purpose fume hoods are available for radioactive work and other individual requirements.

accessory furniture



aquarium and germinating bed
length 96", width 24", height 55"
steel: **no. ES1220**
wood: **no. EW1220**

A complete line of accessory furniture is available, including preparation tables, desks, soil bins, developing tables, printing tables, adjustable chalk boards, magazine racks, etc.

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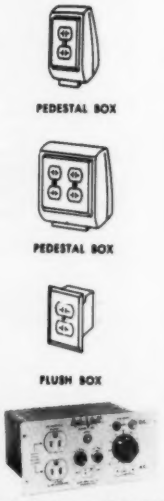
gas, air, vacuum

water

electrical



Lab Volt no. 600-LV

wall sinks

Wall sinks available enclosed with base cabinets or as open leg units. Units are made in six lengths, with and without drainboards.

steel: no. ES502
wood: no. EW502

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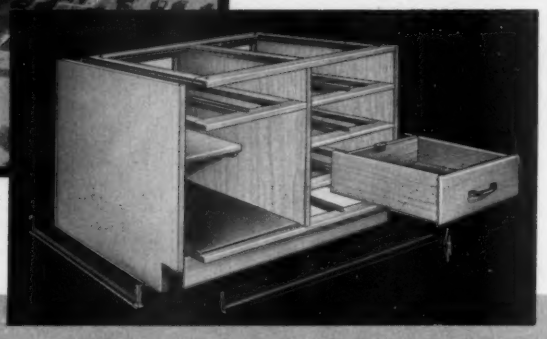

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Wood equipment and furniture by Labcraft is a result of careful study and scientific research in keeping with the modern trend of Educational Science Teaching. It incorporates the latest design features paramount to educators whose tasks it becomes to inspire scientific thought in the minds of our nation's youths. Students trained with the help of Labcraft equipment are better prepared to take their place in the fast moving scientific age.

Illustrated here are only a few items selected from the complete Labcraft catalog containing a full line of equipment now in use throughout the nation in secondary schools, colleges and universities.

METALAB-LABCRAFT DIVISION
SCIENCE EQUIPMENT AND FURNITURE IN WOOD
HICKSVILLE, LONG ISLAND, NEW YORK

WAW47R FUME HOOD
47" Long, 24" Deep, 7'0" High

W5940 6 STUDENT — 2 CLASS UNIVERSITY SCIENCE TABLE
12' Long (without sink), 4'6" Wide, 37" High

V5000 2 STUDENT — 2 CLASS
OMBINATION SCIENCE TABLE
6" Long, 30" Wide, 37" High

W7005 VARI-PHASE TABLE 4 STUDENT — 2 CLASS
7'0" Long, 4'0" Wide at wall, 3'0" Wide at front, 37" High

steel METALAB

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- RUGGED-DURABLE
- FIRE-RESISTANT
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- ADAPTABILITY

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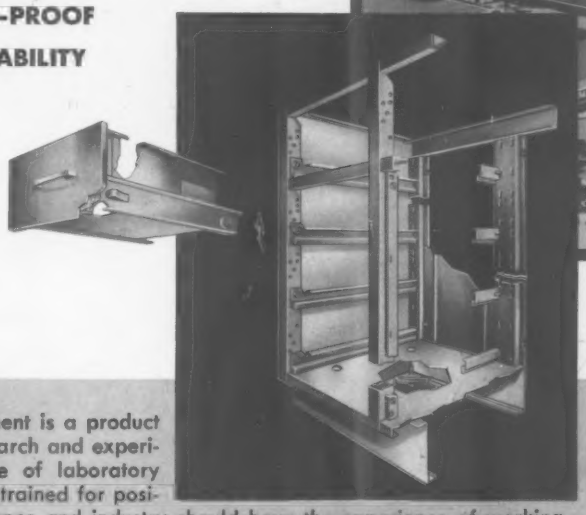

Steel educational equipment is a product of years of Metalab research and experience in the manufacture of laboratory furniture. Students being trained for positions in the world of science and industry should have the experience of working with this accepted type of equipment. The transition from the school science department to the professional laboratory can be accomplished with ease by the students using Metalab equipment.

Illustrated on this page are a few selected items from the complete Metalab steel catalog. You will find this equipment in secondary schools and universities throughout the country.

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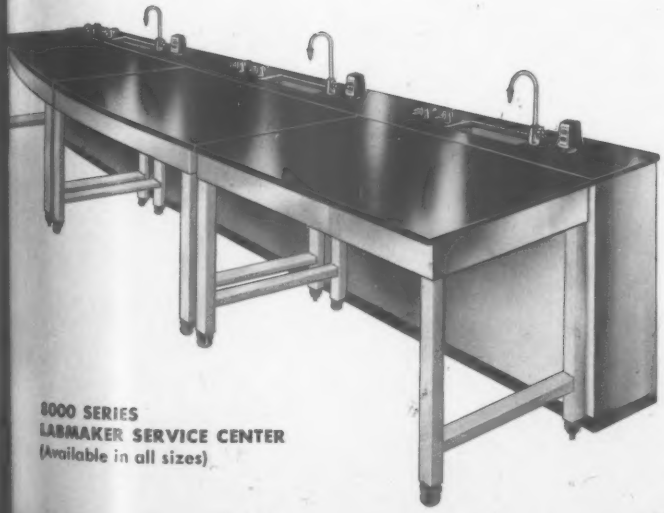
HICKSVILLE, LONG ISLAND, NEW YORK

H-102 FUME HOOD
47" Long, 31" Wide, 8'0" High

CAT. NO. 5920 CENTER TABLE
11'11" Long (without sink), 4'6" Wide, 3'1" High

5130 4 STUDENT — 4 CLASS COMBINATION SCIENCE TAB
72" Long, 48" Wide, 37" High



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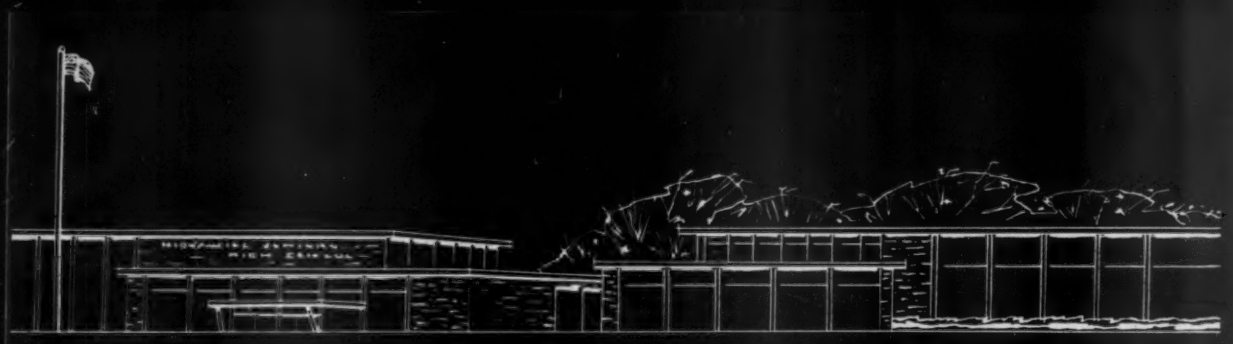
CAT. NO. 5750 INSTRUCTOR'S DESK



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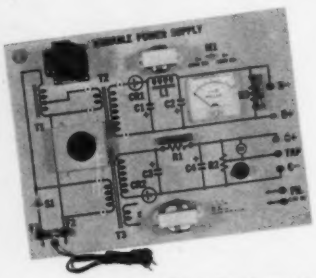
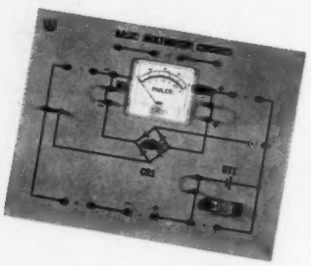
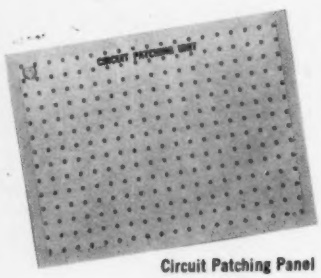
FUNDAMENTALS DEMONSTRATION PANELS



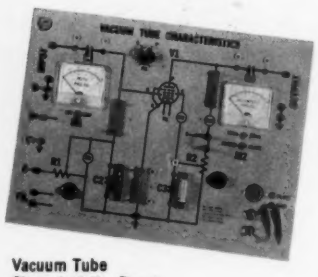
Power Supply Panel



Multimeter Circuit Panel



Circuit Patching Panel



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All basic concepts upon which modern electronics systems are based can be presented with these four demonstration panels.

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All teaching aids, textbooks and work books are provided in this concise and comprehensive introduction to electricity and electronics. Every science student should have a knowledge of the scientific theories it covers . . . and every electronics student must understand them thoroughly.

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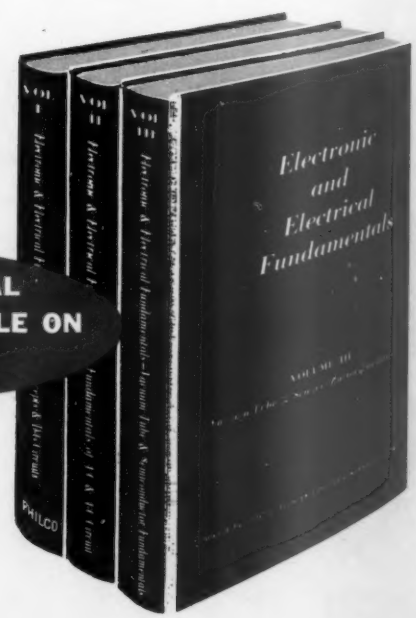

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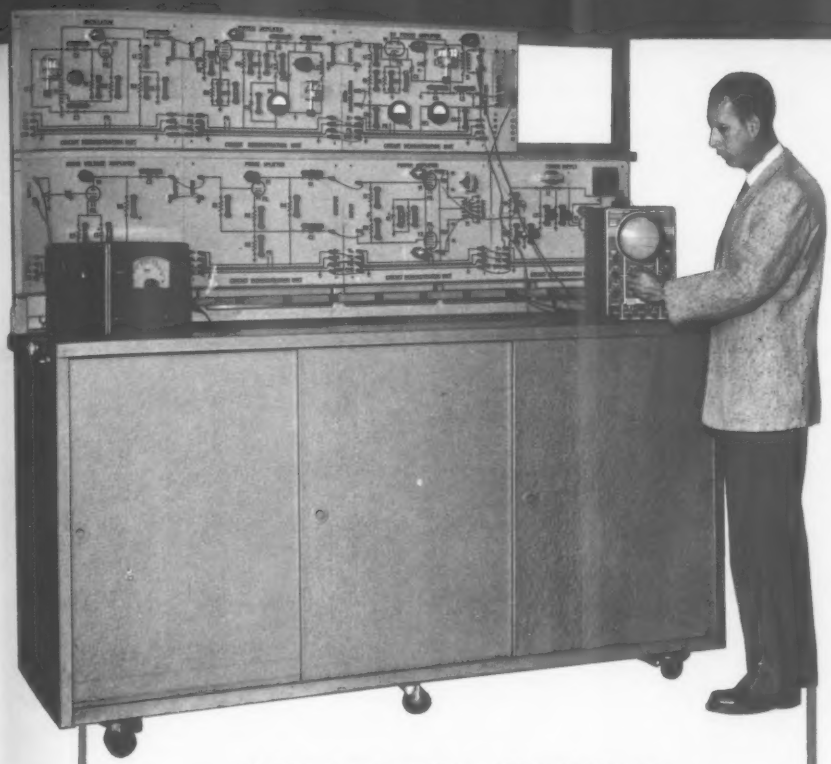

COMPLETE AND FUNCTIONING SYSTEMS ARE BUILT ON THE DEMONSTRATOR A STEP AT A TIME

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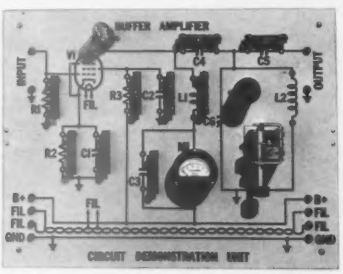
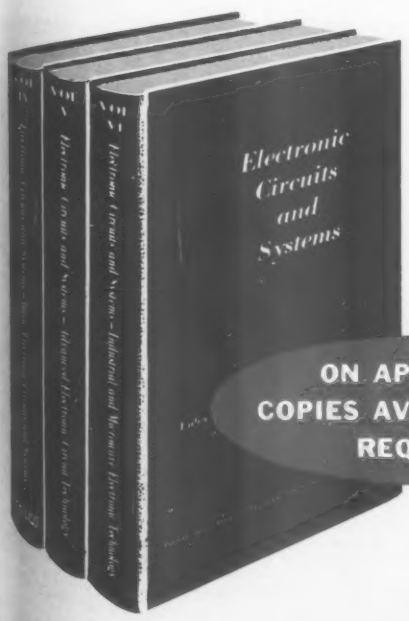


Presents the circuits of electronics a step at a time for easy learning.

Basic circuits are separated and presented on single "building block" circuit panels. Circuits and their functions are easy to learn with this simplified method.

Students learn by doing with matching lab chassis.

For each "building block" circuit panel, there is a corresponding lab unit. With these, the student confirms by experiment the principles discussed and demonstrated on the classroom demonstrator.



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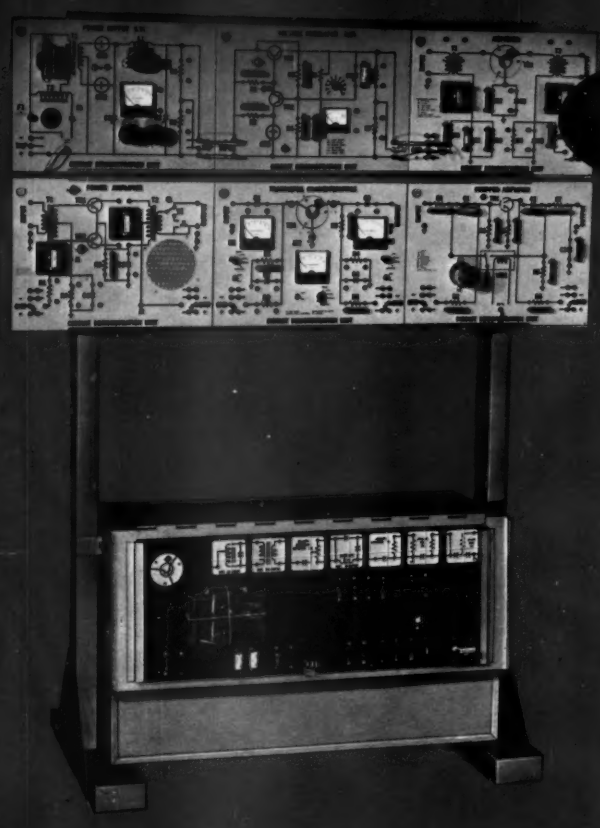

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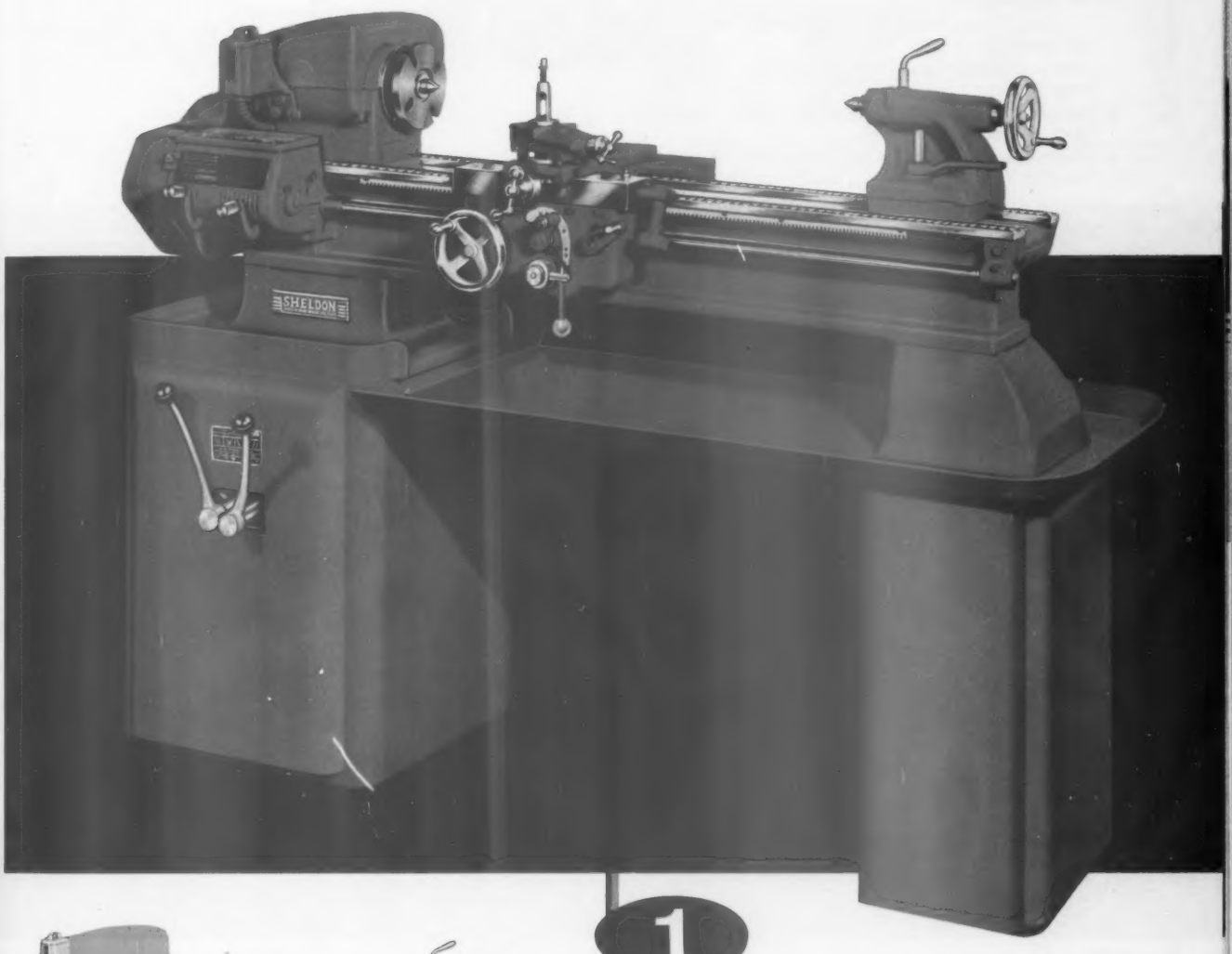
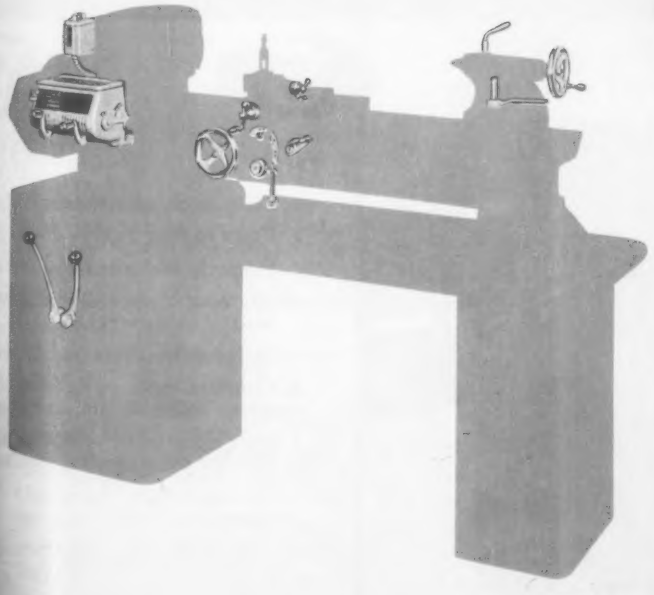
Just as in industry, school shops are modernizing their shop equipment by adding "up-to-date" Sheldon Precision Lathes. With their modern design features Sheldon Lathes are easily maintained. Their centrally-operated controls make teaching easier because students can quickly learn lathe fundamentals and confidently advance to practical class projects.





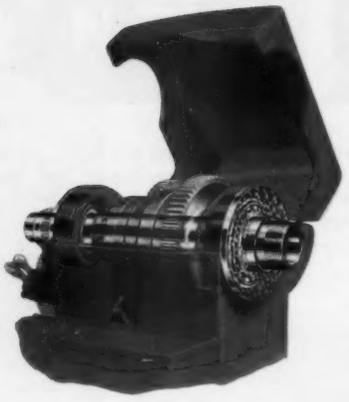
1

Easy to learn on

1. Controls centrally grouped, easy to operate.
2. No end gear changes with standard 60 pitch quick change gear box.
3. Modern apron has new drop lever clutch.
4. Ratchet-action tailstock clamp.
5. Large micrometer dials.
6. Full range of accessories.

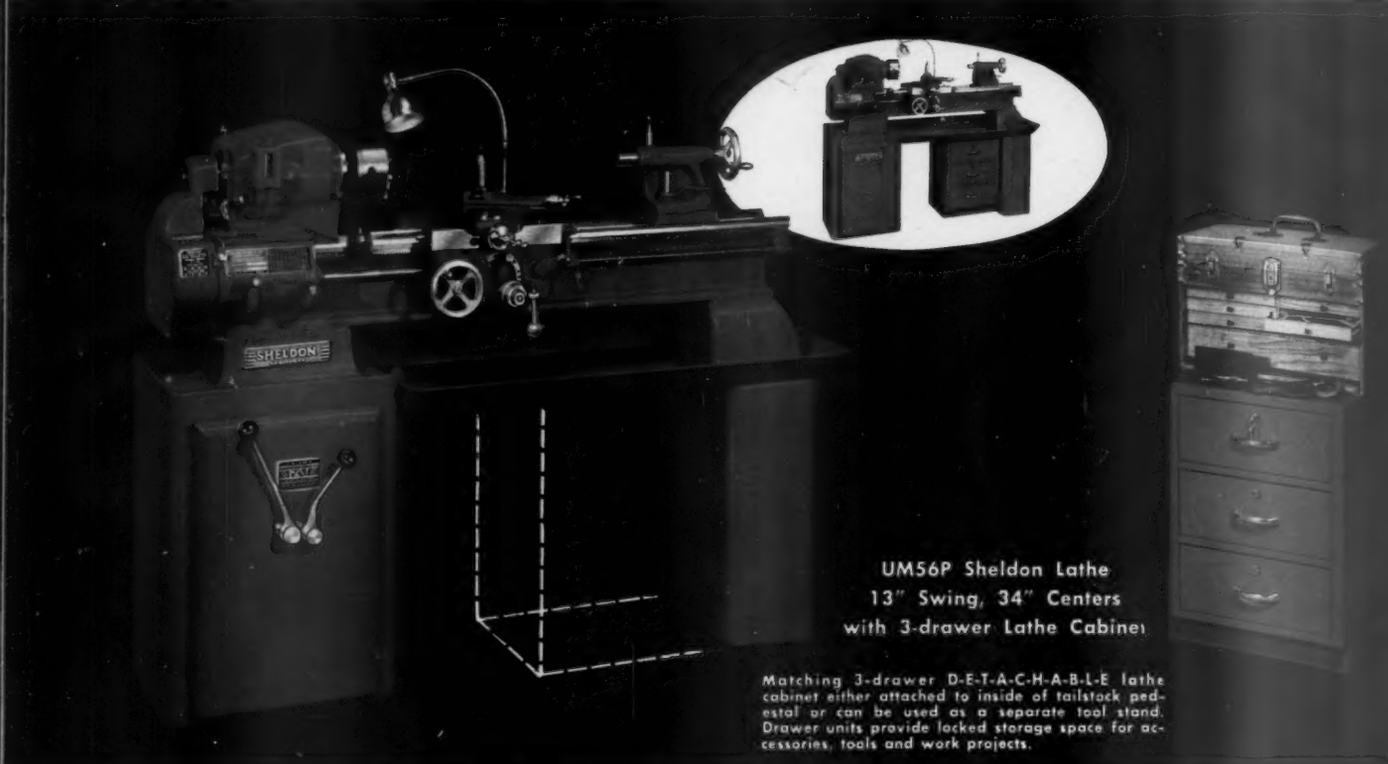
2 Easy to Maintain

1. Spindle bearings require no rescraping, no adjustment when changing from high or low speeds or after warm-up. Only maintenance might be a fractional turn of a take-up nut.
2. Tapered take-up gibs on cross slide and compound slide have simple one-screw adjustment.
3. Hardened bed ways available on 10", 11" and 13" Lathes with 46", 56" and 70" bed lengths.
4. End gears and back gears adjustable for backlash.
5. Hand-scraping insures accuracy and long life.
6. Simple take-up on lead screw for end play, if it should develop.
7. Neoprene cog V-belts give long-life wear.



3 Permit Practical Work Projects

1. Easy-to-operate controls build student confidence and speeds advancement.
2. Industrial in design, in accuracy and capacity.
3. Reserve power—permits demonstration of modern cutting materials; of modern feeds and speeds.
4. Full range of accessories to teach all lathe operations.



UM56P Sheldon Lathe
13" Swing, 34" Centers
with 3-drawer Lathe Cabinet

Matching 3-drawer D-E-T-A-C-H-A-B-L-E lathe cabinet either attached to inside of tailstock pedestal or can be used as a separate tool stand. Drawer units provide locked storage space for accessories, tools and work projects.

4 Modern Design

1. Smooth, clean, all-enclosed design permits clean lathes and a clean shop.
2. New cast iron pedestals and/or modern cabinet bases.
3. Modern V-belt drives.
4. Spindles for threaded, taper key-drive or other modern chucks.
5. Full Quick-Change Gear boxes — no pick-off gears.
6. All-over accuracy—Copy of test sheet with actual readings performed on lathe sent with each lathe as a guarantee of its accuracy.

5 Safety

1. Fully enclosed headstocks.
2. Fully enclosed drive and motor.
3. Properly located safety switch.
4. Aluminum Shear Pins prevent overload.
5. Spline drive protects lead screw.
6. Oversize taper roller bearing withstand both side and end shock.
7. New drop lever clutch easily adjustable for varying work loads.

6

Experienced Distributors and Factory Trained Territory Men

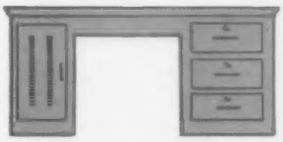
Sheldon distributors are specially selected to handle all school shop needs. They are conveniently located — with experienced sales engineers ready to help in the layout, planning and equipping of school shops. And in each territory Sheldon has their own factory-trained engineers to assist.

(Right) The Sheldon Line provides a choice of pedestal, cabinet or floor-leg bases for Sheldon Lathes—a proper style for every school situation or budget.

Modern styled pedestal mounting

Pedestal mounting with 3-drawer D-E-T-A-C-H-A-B-L-E Lathe Cabinet

Sheldon Lathes are built with a wide range of mountings, bed lengths, drives, swings and center distances. This allows you to select the exact lathe for your academic, space and budget requirements.



Cabinet mounting with built-in chip pan and drawer unit

Floor leg and chip pan assembly for horizontal drive bench lathes

Condensed Specifications

	L	XL	S	M
Swing over bed	10 1/8"	10 1/8"	11 1/4"	13 1/8"
Distance between centers	26", 36"	26", 36"	34"	34", 48"
Hole through spindle	1 1/16"	1 3/8"	1 3/8"	1 3/8"
Drawbar collet capacity	3/4"	1"	1"	1"
Thread pitches available	48	60	60	60
Thread range per inch	4-224	4-240	4-240	4-240

Spindle Speeds

E-type underneath motor drive	(8 speed standard)	50 — 1355
	(16 speed optional)	50 — 1600
U-type underneath motor drive	(8 speed)	50 — 1200
Horizontal motor drive	(10" bench lathes)	59 — 1195
Variable Speed Drive	(Infinite)	40 — 2000

The new Sheldon catalog illustrates and describes 18 different machine tools with complete specifications, floor plan dimensions, and accessory information. It has a special section on "How to Select Your Sheldon Lathe", which will prove of invaluable assistance to the shop instructor, material department, school superintendent and school board —to anyone concerned with setting-up or operating a modern school shop.

Langley High School
Pittsburgh, Pa.

Mumford High School
Detroit, Michigan

Everett High School
School District #2
Everett, Washington

Other Installations

Northwestern State College
Natchitoches, Louisiana

Hayward Union High School
Hayward, California

Bergen County Vocational School
Hackensack, New Jersey

Harrison Technical High School
Chicago, Illinois

East Hartford High School
East Hartford, Connecticut

Illinois State Normal University
Normal, Illinois

University of Buffalo
Buffalo, New York

South High School
Minneapolis, Minnesota

Roosevelt High School
Seattle, Washington

7

Teaching Aids

Sheldon prepares and publishes basic aids for class instruction. Included among these "aids" which are available to shop instructors are:

1. Illustrated wall chart "How a Modern Lathe Operates".
2. Manual: "Care and Operation of a Lathe".
3. Student note book material: 4-page supplementary folder for distribution to students—has reduced version of Wall Chart on "How a Modern Lathe Operates", together with a chart of complete lathe nomenclature.
4. Parts manual: Exploded view drawings.

SHELDON

3000 PQ Size "0" Milling Machine

The RIGHT SIZE for School Shop

. . . Capacity for Practical Projects
. . . Versatility for both beginning and the most advanced courses.

Sheldon Machine Tools make sense for School Shops because they fit educational needs — have the capacity and features that make for easy teaching, simple maintenance and worthwhile courses. Neither "make believe" miniatures nor unnecessarily cumbersome and expensive machines, the Sheldon Size "0" Milling Machine and the Sheldon 12" Back-Geared Shaper are of ideal size and type for worthwhile shop instruction. Every school should specify these Sheldon machine tools to augment their lathe equipment.

SHELDON 3000 PQ Size "0" Milling Machine

Features:

Variable speed drive, power table feeds, back gear unit, quick change gear box. Vertical milling attachments, coolant systems, and dividing head optional accessories for increased versatility.

Specifications:

Spindle:	No. 9 B&S taper
Feeds:	Longitudinal 12" Vertical (max.) 9¼" Power Feed (.0011 to .0084 per revolution)
Speeds:	(standard) 75 to 1400 RPM (slow speed) 20 to 250 RPM
Table Size:	5½" x 22½"
Dimensions:	Height — 62" Floor Space — 29" x 39"
Domestic Shipping Weight:	(approx.) 1300 lbs.

SHELDON 8000S 12" Back Geared Shaper

Features:

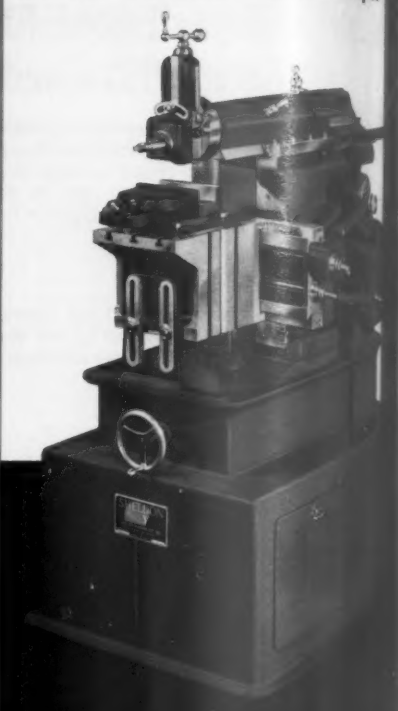
Variable Speed Drive, Swivel Table, Quick-Acting Clutch, back gear unit.

Specifications:

Length of Ram Stroke:	13½"
Strokes Per Minute:	12-180
Vertical Travel of Head:	4"
Vertical Travel of Table:	7"
Top Dimension of Table:	10" by 12"
Range of Feeds:	.0025" to .0175"
Dimensions:	Height — 59" Width — 31" Length — 51"
Weight:	for domestic shipment (approx.) 1800 lbs.

SHELDON

8000S 12" Back Geared Shaper

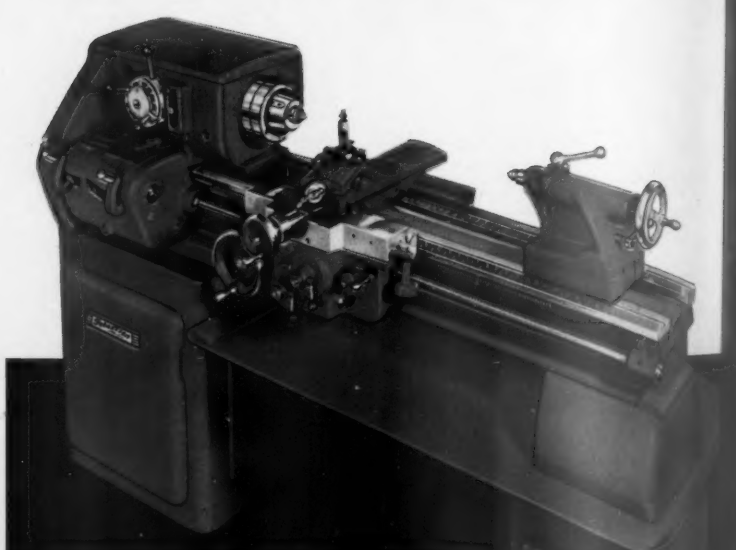


Write for catalogs describing Sheldon 10", 11", 13" lathes, Milling Machines, Shapers and Sebastian 13" and 15" Geared Head Lathes.

Sebastian

13" and 15" Geared Head

PRECISION LATHES



1 For larger swing — more advanced shop training, to teach the power and capacity of heavier-duty geared head lathes.

2 Most modern of geared heads — low in cost, base price includes both pedestals, and hardened bed ways.

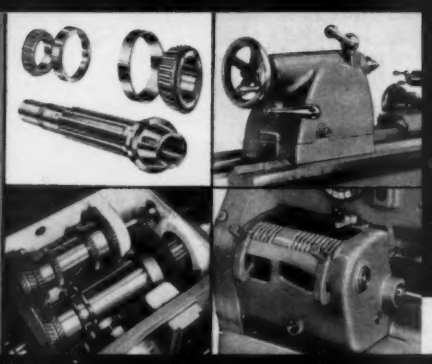
3 Major features:

a. Hardened bed ways.
b. 60 pitch gear box with lead screw reverse.
c. One-piece apron with independent drop lever clutches and one-shot lubrication system.
d. Quiet, efficient headstock—full range of speeds, all through gears — easy-shifting color speed dial—anti-friction bearings throughout, with "Zero Precision" tapered roller spindle bearings.
e. Cam-action tailstock clamp.
f. Modern pedestal legs included in base price.
g. Large micrometer dials, friction type.
h. Hand-scraping for accuracy and long life as for Sheldon lathes with same test sheet guarantee.

SPECIFICATIONS

	13"	15"
Swing over bed	13⅛"	15¼"
Swing over cross-slide	8⅛"	9½"
Spindle nose—standard long taper key drive	L00	L00
Hole through the spindle	1⅜"	1⅜"
Collet capacity—drawbar type	1"	1"
Collet capacity—spindle nose type	1⅛"	1⅛"
Thread pitches available	60	60
Screw threads per inch	4-240	4-240
Feed range	.002 to .120	.002 to .120
Speed range (standard)	35 to 910 r.p.m.	35 to 910 r.p.m.
Speed range (with high speed pulley)	80 to 1250 r.p.m.	80 to 1250 r.p.m.

Both speed ranges standard equipment



SHELDON MACHINE CO., INC.

4263 N. KNOX AVE. • CHICAGO 41, ILLINOIS

H AUDITORIUM, THEATER, MUSIC, ART

EDITORIAL

Researching an Auditorium-Teaching Center — H 1

ADVERTISING

Stage Lighting, Curtains and Equipment

Frank Adam Electric Company — H-2/Ad
Automatic Devices Company — H 7
Century Lighting, Inc. — H 8, 9
Kliegl Bros., Universal Electric Stage Lighting Co., Inc. — H 10, 11
Novelty Scenic Studios, Inc. — H-2/No

Auditorium Lighting, Sound Systems, Acoustics

University Loudspeakers, Inc. — H 12

Arts and Crafts Furniture

Stacor Equipment Company — H 13

To get the most value from your copy of AS&U—use the green-colored Reader Service post cards to get further information on specific products and manufacturers.

Recommended scheme for the proposed Auditorium-Teaching Center at University of Texas, Austin. Dr. L. D. Haskew, Vice President for Developmental Services, set up original requirements.

Researching An Auditorium-Teaching Center

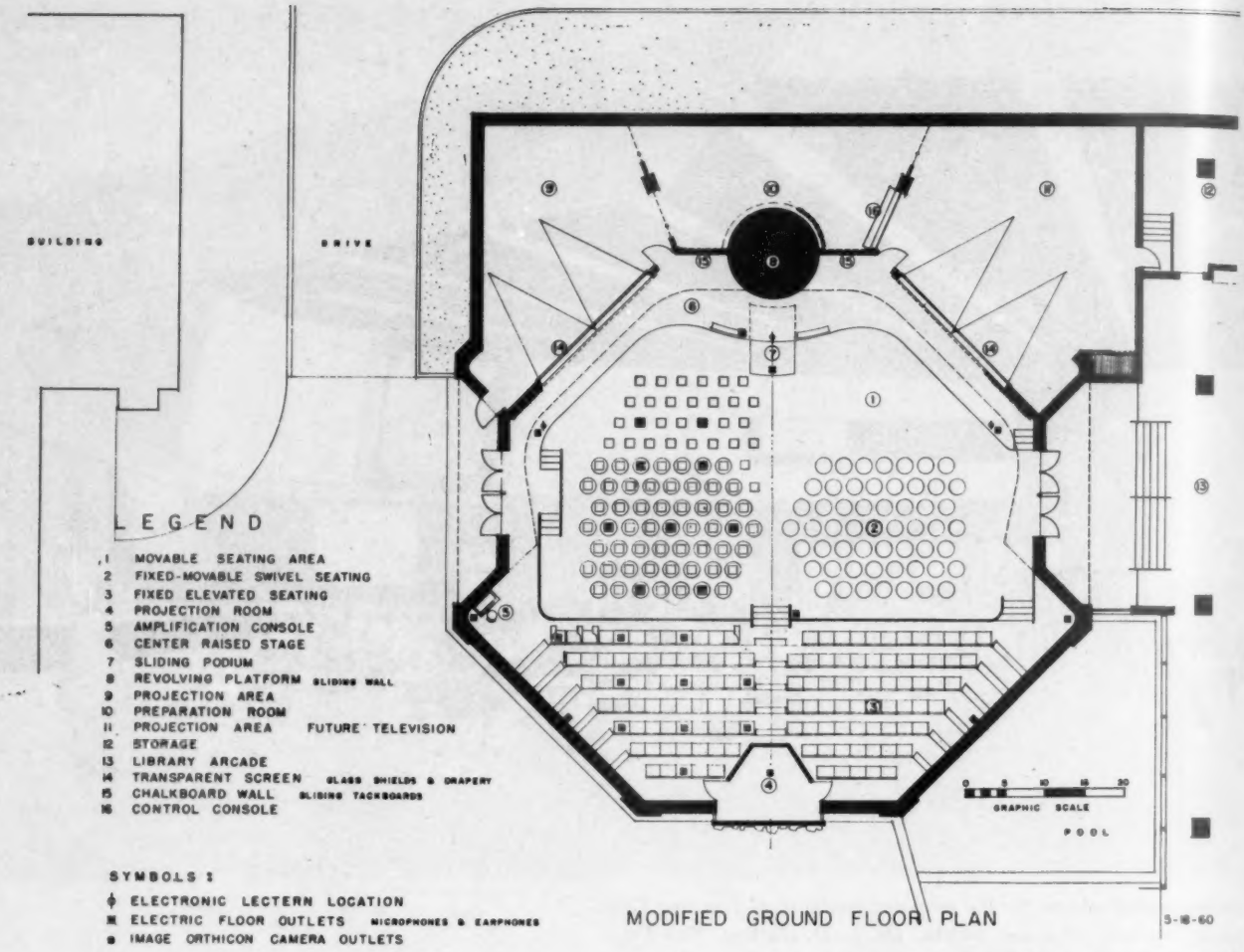
by Charles R. Colbert

Colbert-Lowrey-Hess-Boudreaux, Architects, New Orleans, Louisiana, and Dean, School of Architecture, Columbia University, New York City

Dean Colbert is a graduate of the University of Texas and did graduate work in architecture and city planning at Columbia University. He has lived and maintained his professional practice in New Orleans since 1947. For the past 15 years Dean Colbert has been primarily interested in schoolhouse planning, design and construction.

A NEW AND UNUSUAL teaching facility has been incorporated into the proposed Undergraduate Library for the main campus of the University of Texas at Austin. The "Auditorium-Teaching Center" was envisioned as a lecture hall designed to adapt to the most recent developments in teaching aids and projected new teaching methods.

When the use of audio-visual materials is considered, one usually thinks of an auditorium, theater, or the so-called audio-visual room which generally is no more than a classroom with blackout facilities and a screen. The proposed Auditorium-Teaching Center will be more than any one of these three, and its functional design pre-



After much research and analysis it was found that seating and audience-stage arrangement were important design factors for achieving flexibility.

cludes its restriction to a categorical classification. It is not, in the strict sense, a lecture room, although its main characteristics are developed with this as the major objective.

A grant from the Educational Facilities Laboratories of the Ford Foundation made it possible for the University of Texas to seek assistance in developing the proposed area. At the request of the consulting architects for the University of Texas System, Jessen, Jessen, Millhouse and Greeven of Austin, the New Orleans architectural firm of Colbert-Lowrey-Hess-Boudreaux undertook the design as a research project. Architects for the library and this adjunct to it are George L. Dahl, Architects and Engineers, Dallas, Texas.

Dr. L. D. Haskew, Vice President for Developmental Services at the University of Texas, set up original requirements for the center. He desired a large lecture hall to seat approximately three hundred students as a superb room for sight and sound and extremely flexible for a variety of audio-visual presentation methods.

The first step in solving the problem was to conduct intensive research on audio-visual equipment and instruction and on current thought regarding teaching by mass media. Equipment manufacturers in the New York and Chicago areas were consulted; advanced installations of a similar nature in New York City and at Rensselaer Polytechnic Institute in Troy, New York, were inspected; and conferences were held with authorities in the audio-visual education field. The research architects pictured the area as a "communications center" where the conditions for teaching would be ideal through flexibility and adaptability of space.

The amount of background material obtained was considerable. It was found that communication and technology in education, and mass media have been and are being explored and expounded in many places. What was noticeably lacking was information on the architectural implications of these ideas. It was necessary, therefore, to review such fundamental principles as the psychology of perception and learning, means of communication,

the importance of eye-to-eye contact and maintained interest, and to relate these to the physical enclosure of a teaching situation.

With these factors in mind the principles of audio-visual instruction were studied—equipment, materials, potentialities. Increased interest in audio-visual aids has given diversified and numerous devices to the teacher. Engineering accomplishments are being continually refined, but the basic laws of sound, optics, and sight remain constant. We provided for the present but designed for future developments through flexibility of space.

The methods by which subject matter may be presented, e. g., single or multiple lecturers, projection, demonstration, sound, etc., are numerous and have countless variations. Also of importance are the means of presentation—projection equipment, chalkboards and tackboards, electronic programmers, records, tapes, etc.

After an analysis of all conceivable types of presentation methods and media, the functional requirements of seating and audience-stage arrangement emerged as the most important design factors for achieving maximum flexibility of space. The interrelationship of these two factors and their dependence on the projection media to be used made it difficult to isolate one from the other in the design development. To illustrate this point and to show how the research was accomplished, a detailed analysis of seating requirements from the preliminary design brochure is presented.

Functional Requirements—Seating

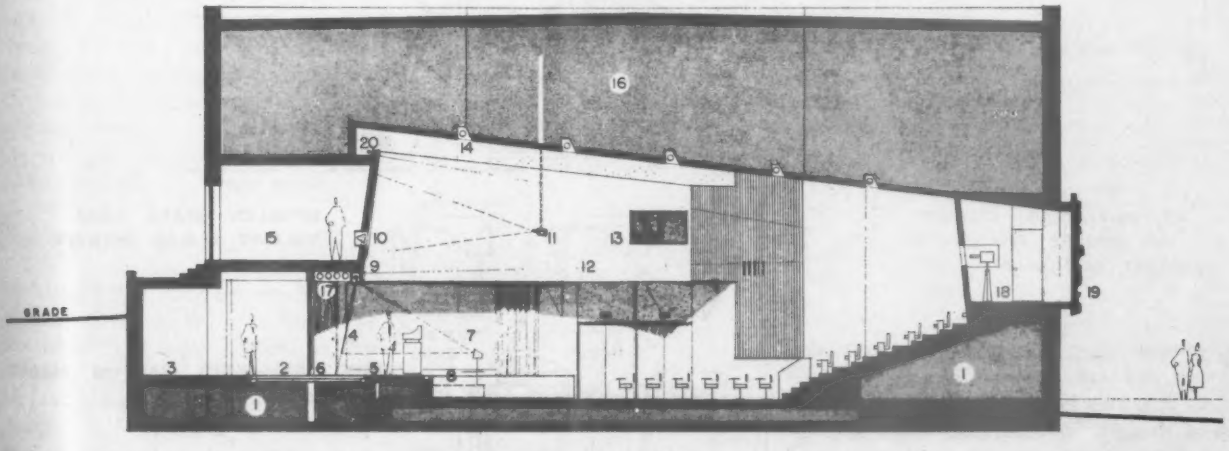
Access. Seats should be arranged to provide easy entrance and exit. Conventional arrangement of access is front to rear with intermittent cross aisles as required for accessibility to all sections. Auditorium-type seating utilizes minimum side spacing, center to center, and is most practical in the case of a single focal point. Movement is restricted horizontally except in the aisles where freedom of direction is mandatory.

Continental-type seating, where horizontal access and exit is easier, usually requires more floor area but permits greater flexibility in movement. If space is added side to side, variable focal points can be viewed by the use of swivel seating.

Sight Lines. The critical angle of view is limited by the distance between the spectator's eye and the head of the person directly in front. The distance can be effectively increased by staggering the rows of seating in center areas and aligning rows in side areas, which automatically staggers these seats with respect to central vantage points.

By sloping the floor upward toward the rear of the auditorium, the problem of vertical sight angles is reduced, and low presentation and projection

1 UNDERFLOOR ACCESS
2 REVOLVING PLATFORM
3 PREPARATION - STUDIO AREA
4 PULL-DOWN OVERHEAD PROJECTION SCREEN
5 LECTERN LOCATION
6 SLIDING WALL - CHALKBOARD FACED
7 SIDE SCREEN - REAR PROJECTION
8 SLIDING PODIUM
9 MAIN SCREEN VALANCE
10 CONCEALED MAIN SCREEN SPEAKERS
11 TELESCOPING BARREL-TYPE T.V. PROJECTOR LOCATION
12 SCREEN VALENCE SMOOTH WHITE PLASTER
13 OBSERVATION BOOTH
14 CONTROLLED DOWN-LIGHTING
15 MECHANICAL EQUIPMENT AND STORAGE
16 ROOF STRUCTURE, DUCTS, AND CATWALKS
17 CONCENTRATED STAGE LIGHTING
18 PROJECTION BOOTH
19 SCULPTURED PANEL
20 COVE LIGHTING



MODIFIED TRANSVERSE SECTION

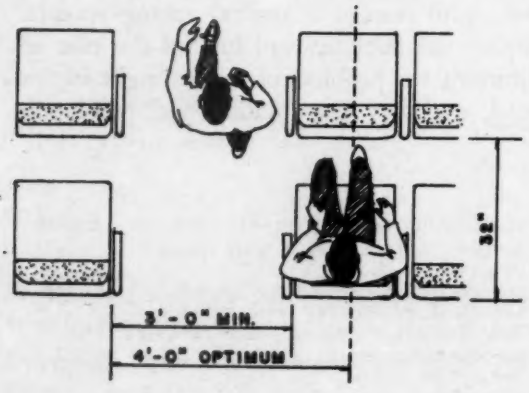
areas can be utilized. If, however, a level seating arrangement is desirable, raised presentation and projection areas are essential.

The vertical limitation of good viewing of a projected image is 30° from the horizontal at eye level to the top of the viewed surface. Maximum sight angles for side areas are considered to be 40° from the far side of the screen. Lesser angles produce distortion of the image to the viewer. With two or more focal points, it becomes necessary either to have some means of changing the position of the seat or to place seats far back enough for the angle of vision to encompass all focal points.

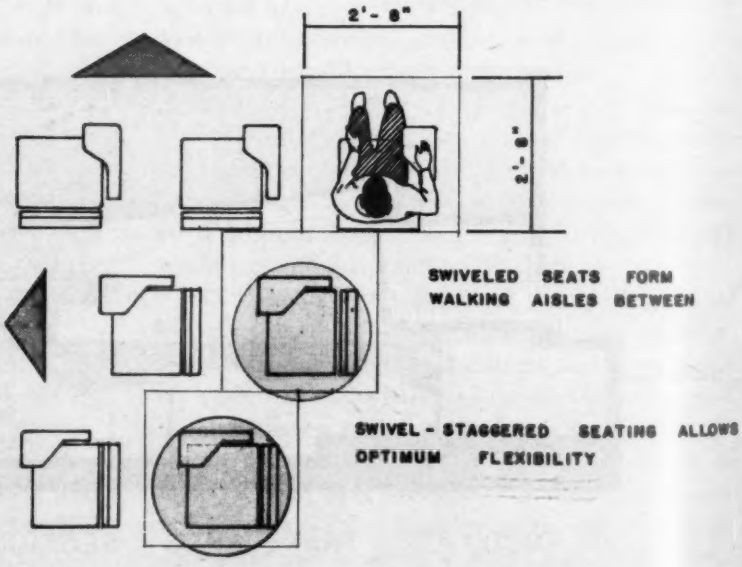
Flexibility. In an auditorium with one focal point, fixed auditorium-type seating is adequate. With standard seating it is impossible to break a large assembly into smaller groups. When multiple focal points are introduced or when variation of group size is desirable, flexibility of seating is essential.

To allow maximum use of the auditorium, it can be divided into three areas with different seating requirements. The area close to the stage is ideal for lecture situations but not desirable for projection viewing. Movable chairs with tablet-arm attachments are advisable here. At the rear conventional auditorium seating is both practical and desirable because the distance from the lecture area or stage is great enough to allow convenient viewing of multiple focal points. In the middle area where multiple focal points require turning in either direction for best vantage of projected material, swivel seats, which can be fixed, could be

This seating is uncomfortable, has a fixed position, is inflexible and causes poor posture.



Seats should be arranged to provide easy entrance and exit. Conventional access is front to rear with intermittent cross aisles as required for accessibility to all sections. Auditorium-type seating utilizes minimum side spacing, center to center, and is most practical in the case of a single focal point. Movement is restricted horizontally except in the aisles where freedom of direction is mandatory.



Continental-type seating, where horizontal access and exit is easier, usually requires more floor area but enables greater flexibility in movement. If additional space is provided side to side, variable focal points can be viewed by use of swivel seating.

used most advantageously. Incorporation of three types of seating not only allows the best possible conditions for viewing from any given location but provides maximum flexibility for presentation methods and variations in usage.

Comfort and Movement. Audience comfort must be considered in an ideal lecture center to avoid restlessness and inattentiveness. Too often economy dictates fixed and restrictive audience seating. Confining arms, hard seats and backs, restricted aisles, etc. may cause poor posture and contribute to loss of interest. If allowances for stretching, leg and arm movement, body turning, and change in direction are made, audience response and participation greatly increases.

Three Types of Seating

As a result of the study of seating requirements, three types were incorporated into the final design:

1. Fixed auditorium seating, with cushions on seat and back and folding tablet arm, was selected for the rear section of the Auditorium-Teaching Center. Distances between viewer and viewed are sufficient to allow change of center of interest within a comfortable movement of the viewer's head and eyes. Seating is raised to allow better viewing of stage areas, projection screens, and the level floor area at the front of the room.

2. Fixed, removable, swivel seats with tablet arms in staggered rows front to rear were selected for the central, level section of the Auditorium-Teaching Center. Swivel seating was deemed best in this area and students can readily change their center of interest up to 360° for the multiple focal points. They can also divide into small discussion groups. The same seats were considered in the comfortable viewing area for the large overhead movie screen, but are to be fixed in place as part of the permanent seating of the center. To allow greatest flexibility at the central level floor for large exhibitions or "country fair" type assemblies, seats will be the clamp-on type which can be removed.

3. Movable, folding tablet arm chairs were placed in the front portion of the Auditorium-Teaching Center. These seats may be used for large assemblies, where the center of interest is confined to the stage area, or for individual lecturers who are not using the large overhead movie screen. The chairs can be removed and stored under the stage platform to clear a large area in the front portion of the level floor.

Final Design of the Center

The final design of the Auditorium-Teaching Center is illustrated in the accompanying floor plan and section. To insure maximum flexibility of presentation methods, it was necessary to accommodate a central grouping of six projection screens

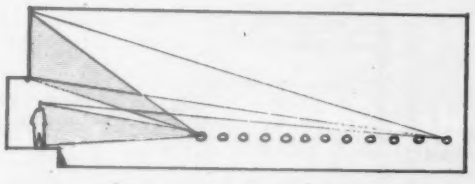
PADDED SEAT AND POSTURE BACK - SWIVEL - POSSIBLE ELECTRICAL CONNECTIONS FOR EARPHONES, ETC

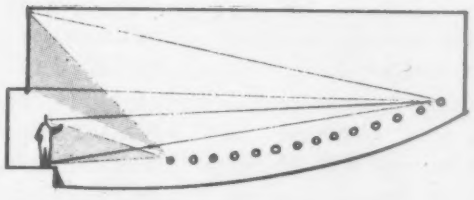
Audience comfort must be considered in an ideal lecture center to avoid restlessness and inattentiveness.

The critical angle of view is limited by the distance between the spectator's eye and the head of the person directly in front. The distance can be effectively increased by staggering the rows of seating in center areas and aligning rows in side areas, which automatically staggers these seats with respect to central vantage points.

FLAT FLOOR

RESTRICTS STAGE VIEW OF REAR AUDIENCE REQUIRES STAGGERED SEATS





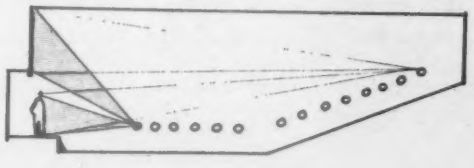
SLOPED FLOOR

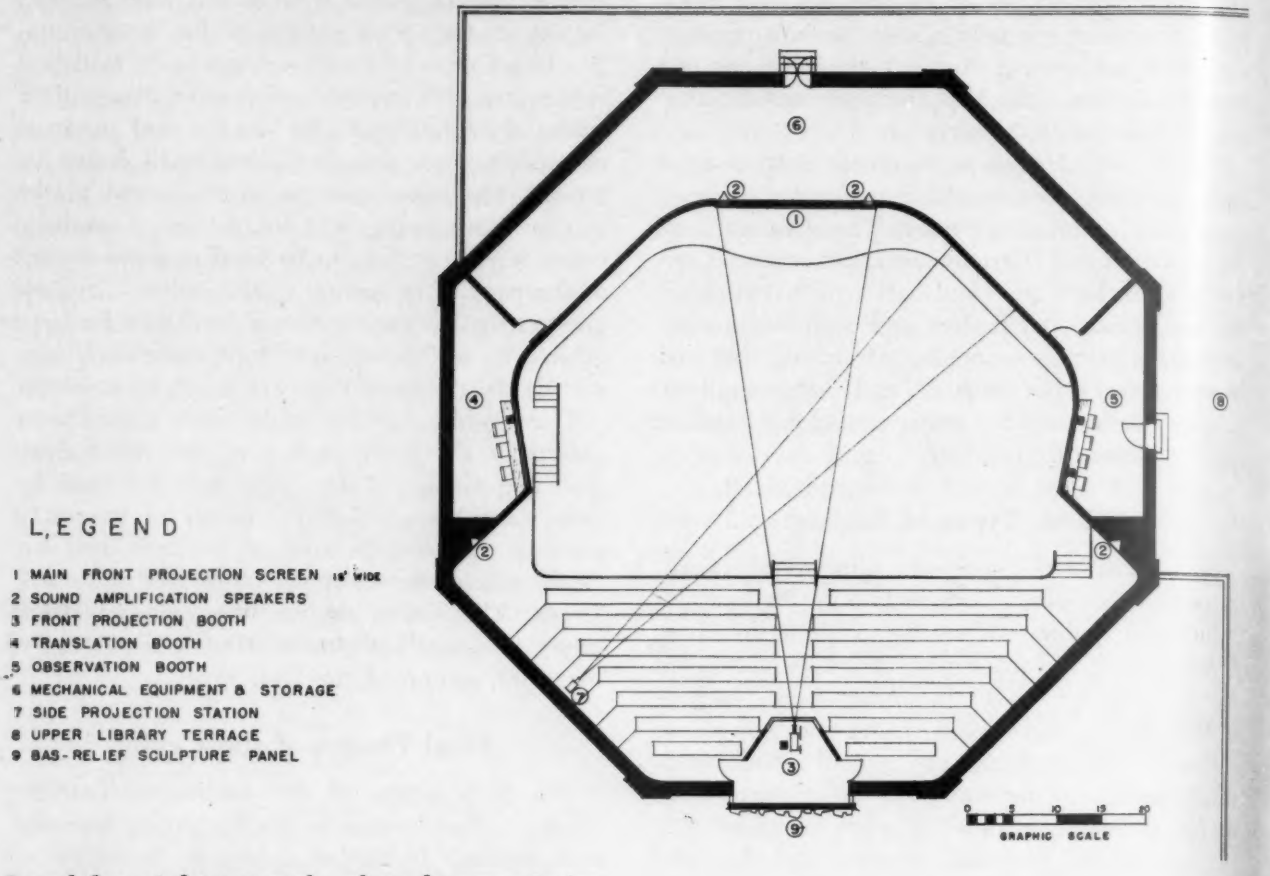
PROVIDES EASY VIEW OF STAGE AND SCREEN, BUT RESTRICTS SEATING ARRANGEMENT

By sloping the floor upward toward the rear of the auditorium, the problem of vertical sight angles can be reduced, and low presentation and projection areas can be utilized. If, however, a level seating arrangement is desirable, raised presentation and projection areas are essential.

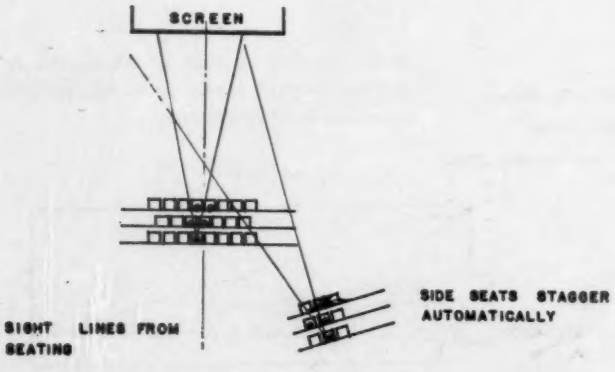
COMBINATION FLOOR

FLAT AREA ALLOWS FLEXIBLE SEATING. RAISED AREA ALLOWS FIXED SEATING WITH GOOD SIGHT LINES





Second floor of the center, plan above, houses projection, translation and observation booths. Sight lines from seating are traced below.



on a stage area which extends around the front of the seating area to provide access to side screens. At the center front of the stage is a motorized revolving platform on which demonstrations can be set up in advance on the reverse side of the platform, brought into view at any desired moment, and removed again when their function has been completed. This revolving feature also permits preparation of demonstration material for subsequent presentation while a lecture is in progress. The platform has a central partition with magnetic chalkboards mounted on both faces. This partition is divided into two sections and installed on an overhead track so that the entire platform may be exposed to view when desired.

Another innovation in the stage area is a telescopic podium which is stored under the stage platform when not in use. It slides out and has sufficient space for a lecturer and overhead projector. It also serves as a convenient intermediate landing between the stage and seating levels.

Our research indicates that the physical and psychological possibilities of the proposed center constitute the challenge of a new educational concept. With its possibilities of diversified use, equipment and multiple presentation locations and methods, this fully developed teaching environment will lend unprecedented excitement to any learning situation.

AUTOMATIC DEVICES COMPANY

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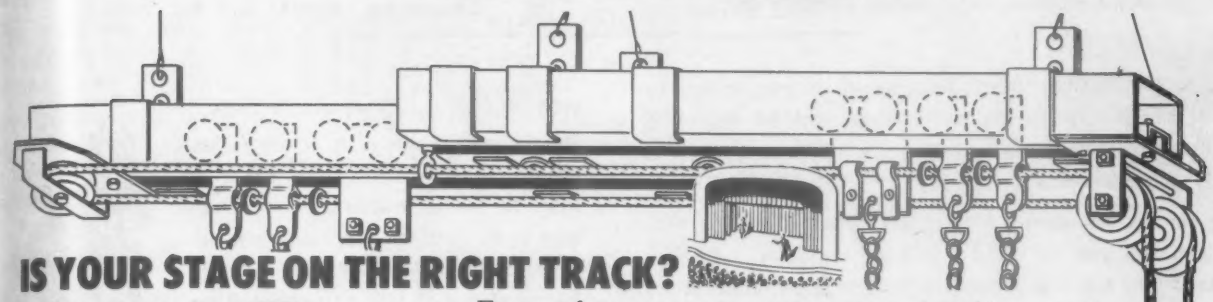

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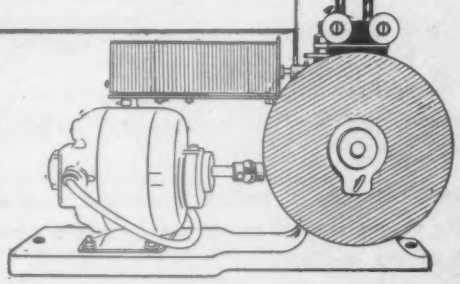
The most famous name in curtain tracks and machines—that's ADC, world's foremost manufacturer of stage and drapery hardware. Write for our catalog—we have a dealer in your city.

SELECTION CHART

TRADE NAME	CURTAIN TRACK DESCRIPTION
SILENT STEEL	Heavy duty steel curtain track for heavy weight curtains. Polyethylene ball-bearing carriers roll on two separate parallel treads. App. track shape: 3″ x 3″ Models 280, 281, 282. For all lengths.
BESTEEL	Medium duty steel curtain track for light and medium weight curtains. Polyethylene carriers roll on two separate parallel treads. App. track shape: 2″ x 2″ Models 170, 171-N, 171-R. For lengths up to 36 ft.
Fenesteel	Window curtain track—steel. Installed single in one section featuring 16″ overlapping master carriers. Polyethylene carriers roll on two separate parallel treads. App. track shape: 2″ x 2″ Models 260, 261-N, 261-R. For lengths up to 36 ft.
Curvit-Sure	Medium-to-heavy duty aluminum curved track for medium-to-heavy curtains. Neoprene ball-bearing carriers roll on two separate parallel treads. Minimum radius: six feet. App. track shape: 2¼″ x 2¼″ Models 340, 341, 342, 350, 351. For all lengths.
TRIPL-I-TRAC	Heavy duty aluminum cyclorama track for heavy-weight "walk-along" curtains. Nylon ball-bearing carriers roll on two separate parallel treads. Curved on-the-job to virtually any degree or radius. App. track shape: 3½″ x 1″ Model 422. For all lengths.
RIG-I-FLEX	Heavy duty aluminum track for medium-weight curtains. Neoprene ball-bearing carriers roll on two separate parallel treads. Curved on-the-job to virtually any degree or radius. App. track shape: 2½″ x 1″ Models 140, 141, 142. For all lengths.
FLEX-I-TRAC	Light-to-medium duty aluminum cyclorama track for "walk-along" curtains. Nylon carriers roll on two separate parallel treads. Curved on-the-job to virtually any degree or radius. App. track shape: 1½″ x ¾″ Models 132, 132-B. For short to medium lengths.
TRAK-EZE	Medium duty aluminum window track for medium weight curtains. Installed single in one section. Single-wheeled nylon carriers roll on separate parallel treads. App. track shape: 1½″ x 2″ Model 210. For lengths up to 30 ft.
Spanotrac	Light-to-medium duty aluminum drapery track for light-to-medium weight curtains. Installed single in one section featuring 7″ overlapping master carriers. Rubber carriers roll on two separate parallel treads. App. track shape: 1″ x 1″ Models 104, 105. For lengths up to 20 ft.
cubi-trac	Light-to-medium duty aluminum track especially for hospital cubicle curtains. For both ceiling and suspended installations. 90° 12″ radius curves supplied. Polyethylene carriers roll on two separate parallel treads. App. track shape: 1″ x 1⅛″ Model 110. For subdividing bed areas.

CURTAIN MACHINES — ADC also has a complete line of curtain machines known by the trade names of Hercules, Silver Service, Autodrape and Tom Thumb. All come in a variety of models ranging in purpose from heavy duty to light duty.



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521 West 43rd Street, New York 36, N. Y.

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Lighting for the educational theatre poses special problems for the educator, the architect, and the engineer; problems which our engineering staff will consider with you in determining the lighting equipment best suited to your requirements.

Century provides full coverage of lighting equipment needed for auditorium and stage with the assurance of quality, versatility, and control which an educator must have as basic conditions for proper instruction and fully realized excellence of production.

Ease of operation, rugged dependability, compactness, and flexibility are basic adjuncts to the excellence of optical design which gives character to lighting equipment engineered by Century.

The practical value of Century engineered equipment can be demonstrated by our remote control systems: the C-I and Theatron consoles afford the student complete and facile command of elaborate effects without the limiting requirements of physical strength or manual dexterity. The student freely explores the range of qualities and functions of light, tests the application of varying combinations to the dramatic situation, and grows in assurance of understanding and full freedom of expression. Lighting design may be accomplished with accuracy, safety, and with important savings in time.

STRIPLIGHTS: BORDERLIGHTS

SIZES 100, 150, 200/300 WATTS

The borderlight serves the essential functions of tonal lighting and of blending the spotlighted areas.

Century borderlights are available in a wide range of desirable design features, including compartmented types using the highly efficient PAR and Reflector lamps.

STRIPLIGHTS: FOOTLIGHTS

SIZES 100 AND 150 WATTS
9 LIGHT OR 12 LIGHT

Footlights function as fill-in tonal lighting for the acting area with diffused upward illumination offsetting sharp shadows created from overhead lighting.

Century footlights are available in semi-open trough or disappearing section designs, wired for color control in three or more circuits according to customer specifications.

SPOTLIGHTS: LEKOLITES—precision beam

250 TO 5000 WATTS

Precision control with great efficiency characterize this basic lighting unit for acting areas. The Lekolite provides a sharply defined beam of high intensity. A soft beam-edge can be effected by simple lens adjustment. Through the use of shaping devices introduced at the "gate", (built into the instrument with external handles) the beam can be given any pattern or geometrical shape.

SPOTLIGHTS, FRESNELITES—soft edge beam

75 TO 10,000 WATTS

An excellent instrument for lighting the upstage acting areas, Century's Fresnelite combines the advantages of great efficiency, soft edge, and variable beam spread.

A versatile, compact unit of rugged construction, the Fresnelite is available in a wide range of sizes from the 3" 75 watt unit up to maximum intensity of the 20" 10,000 watt Fresnelite.

FLOODLIGHTS: WIDE ANGLE

100 TO 2000 WATTS

Century's compact, efficient floodlight provides a medium-to-wide spread, soft edge beam for large surfaces of scenic backings at close range. Each unit is provided with a mounting clamp for pipe attachment. Each unit is designed to receive a color frame. These range in size from the 250 watt Wizardlite to 18" 1000-2000 watt units.

FLOODLIGHTS: BEAMLIGHTS

250 TO 5000 WATTS

Century's BEAMLIGHT PROJECTOR, utilizing a large, shallow parabolic reflector and a small, high-powered source, delivers an intense beam of light of from 8° to 25° spread.

The Beamlight is excellent for long distance floodlighting and for strongly definitive side and back lighting; an excellent motivating source for sunlight and moonlight.

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CENTURY LIGHTING, INC.

FOLLOW SPOTLIGHTS

Century incandescent follow spots provide high intensity for medium-to-long range throws.

Superior performance is assured by the flickerless, even intensity; by the ease of dimming; and by the characteristic warm color qualities of the incandescent source. Soft to sharp definition of beam shape is achieved through lens focusing and built-in framing shutters.

Operating handles are conveniently placed for easy and exact control.

1500 TO 5000 WATTS

EFFECT PROJECTOR: PROJECTORAMA

The Century series of projection machines is adaptable for use with moving discs, moving film, or standard slides from 3¼" x 4" to 5" x 7". High quality optical systems provide even, brilliant screen illumination for front or rear projection. A complete range of objective systems is available for various distances and image sizes.

The effect machine affords the designer an infinite range of opportunities for effective visual presentation.

2000 TO 5000 WATTS

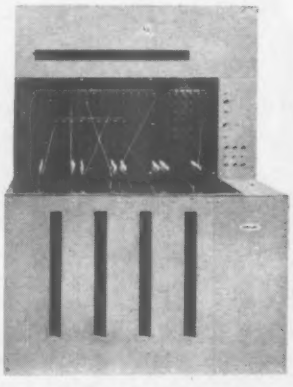
CROSS CONNECT UNITS
SAF-T-PATCH PLUG AND JACK BOARD

The Century cross connect panel permits selective control of any light on the stage by any circuit of the control board.

This flexible type of circuit selection requires fewer dimmers. It permits the convenient grouping of related light loads on a single dimmer.

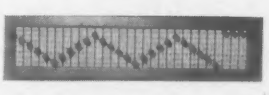
Utilizing the Saf-T-patch cold plugging, the circuit selection is safe and positive.

Retractable cables maintain the taut, well ordered appearance necessary to efficient operation.



SLIDER PATCH

Slider Patch is a **dead front** cross connecting system which gives infinite flexibility between any number of control circuits and any number of load circuits. The simplest, most direct and safest cross connecting system.



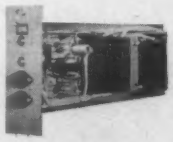
CONNECTOR STRIP

Century wireways, variously mounted for horizontal or vertical runs, provide a series of receptacles at convenient locations in various parts of the stage, thus reducing the tangle of lengthy runs of stage cable.

OUTLETS 20 AMP AND 50 AMP AS REQUIRED

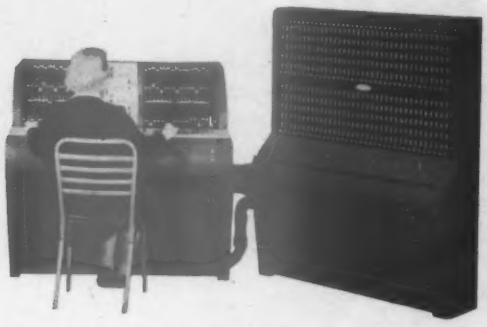
REMOTE CONTROL CENTERS: CENTURY'S C-CORE DIMMER

Century's C-Core system utilizes the silicon controlled rectifier. It surpasses other lighting control systems in performance versatility, installation economy, and permanently efficient operation. The C-Core unit is practically instantaneous in response, is noiseless, is made of inert permanent elements and offers no interference to audio or video circuits. This revolutionary control unit is adaptable to any Century control console.



CAPACITY
3 KW TO 10 KW

C-I BOARDS



Complete mastery of lighting control for the theatre is provided by the C-I Console and multi-scene preset system. The control and range capacity are engineered in accordance with the specific requirements of each installation.

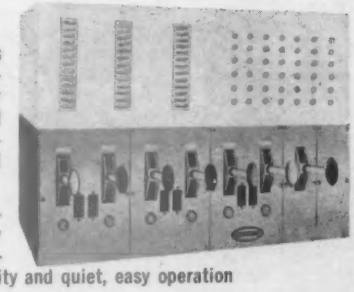
The control components are compactly and functionally designed to permit fingertip command of all lighting by a single operator. Control units assure instantaneous response, proportional cross fading, full range intensity control, and a flat dimming curve with no audio or video interference.

THEATRON CONSOLE

Century's Theatron dimmer preset system provides maximum versatility of lighting control with minimum operational space requirements. The basic two-scene preset facilities provide both circuit selection and brightness control. The placement of controls has been designed for maximum economy and ease of operation. The easy reach of a single operator commands all controls needed for elaborate stage lighting.

DIMMERPAKS

The Century Dimmerpak series covers a wide range of lighting control combinations ideally suited for small theatres and auditoriums as low budget portable or permanently installed equipment.



The basic auto-transformer control component provides highly efficient, flickerless, and accurate control of lighting intensity and quiet, easy operation with negligible heat.

INTERPLUG-PAKS with flexible circuit cords and multiple alignments of dimmer receptacles, may be added for greater versatility of control.

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The Educational Theatre Division of Kliegl Bros. offers a planning and advisory service to assist school personnel, architects and engineers in the solution of lighting problems. Without obligation, Kliegl will submit lighting plans, specifications, illustrative material and budget prices to meet individual project requirements.

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For use in gymnasiums. Flush, Surface or Pendant types. Louvers guard against accidental breakage.

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Concealed above ceiling. Especially designed to provide general illumination in large areas from unusually high ceilings.

REGRESSED LENS DOWNLIGHTS

Provides direct illumination without glare. For general illumination as well as accent lighting.

LIGHTING CONTROLS

ROTOLECTOR® KLIEGBOARDS

The industry's finest and safest interconnecting rotary circuit selector. Used to connect branch lighting circuits to various dimming and non-dimming feeder circuits. Eliminates patch cords and plugs.

SAFPATCH® KLIEGBOARDS

Cold patch type interconnecting circuit selector. Used for cross connecting branch lighting circuits to desired dimming and non-dimming feeder circuits.

SCR® DIMMERS*

Using 2 silicon controlled rectifiers in a back to back circuit, SCR Dimmers represent the newest concept in dimming control. Completely electronic to properly serve every modern dimming requirement.

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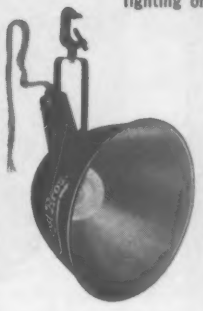


SCOOPS

Smooth even illumination for cyclorama and general area lighting.

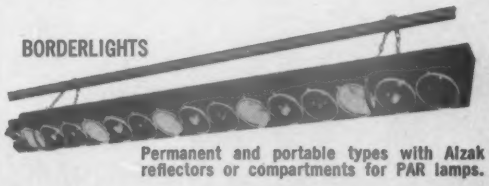
FRESNEL LENS SPOTLIGHTS

General area illumination or soft edge high intensity spotting.

FOOTLIGHTS

Disappearing and portable types.

BORDERLIGHTS



Permanent and portable types with Alzak reflectors or compartments for PAR lamps.

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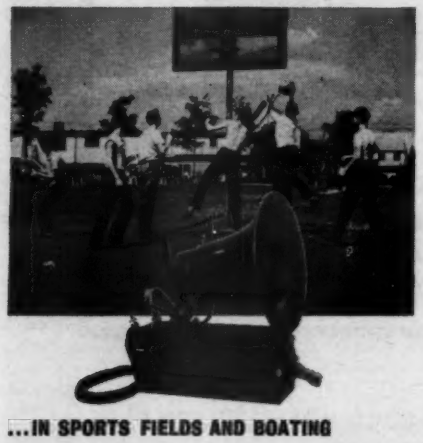

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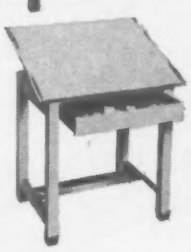

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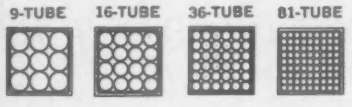

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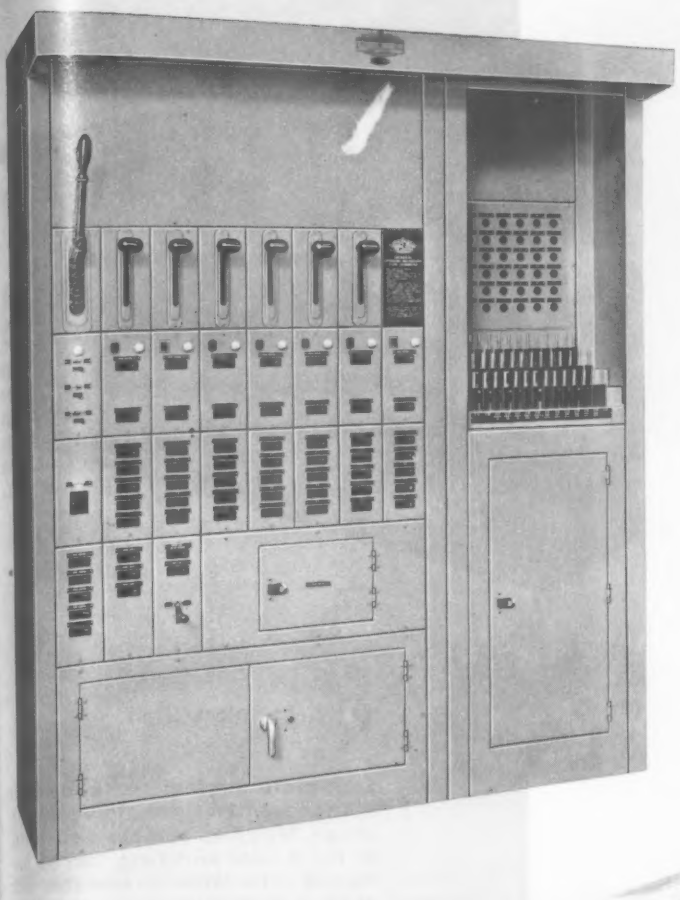

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STAGE LIGHTING
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...every other small or large public and institutional auditorium and exhibition hall

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THE PRODUCERS' COUNCIL — AFFILIATED WITH THEATRE TECHNICAL INSTITUTE

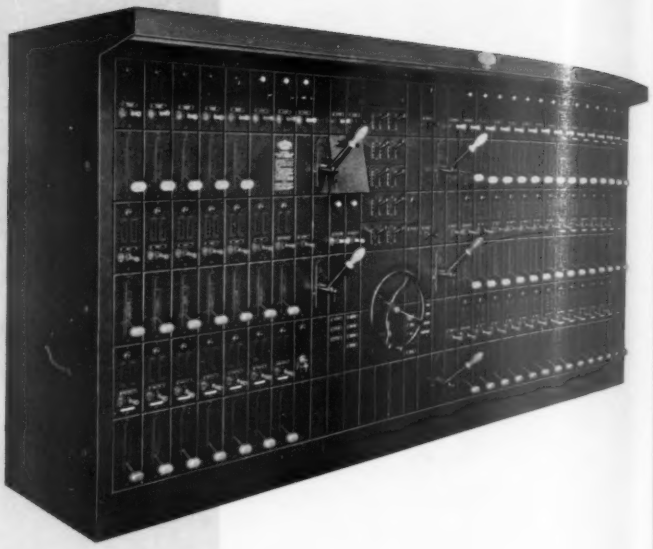
BULLETIN 852

FRANK ADAM

STAGE LIGHTING CONTROL SYSTEMS

instant, versatile command of light and color through the entire spectrum

As a leader for more than three generations in the design and production of lighting controls for every type and size of stage, theatre, exhibition hall and auditorium, Frank Adam Electric Company has both the experience and facilities to furnish the most modern switching and dimming equipment for every requirement, no matter how complex, whether large or small.



Safe—Easy to Operate And Service

Frank Adam control boards are noted for simplicity of operation. They can be competently operated by inexperienced persons with only minimum instruction. They can be constructed to permit easy accessibility from front or rear for whatever infrequent service is necessary—they are thoroughly dependable—are entirely safe, and carry the Underwriters' Laboratories label.

Exclusively Engineered For Each Installation

All Frank Adam stage lighting switchboards are especially engineered and fabricated to the specific requirements of each installation. Typical systems include:

- Manual control
- Modified Pre-set Remote Control
- Multiple Pre-set Switching and Dimming Remote Control
- Mobile Color Lighting Control

Each switchboard, except console types, has hooded overhead light, with dimming control available, for illuminating the panel front.

Construction Features

Formed sheet steel panels over rigid, free-standing steel understructure. Back and ends can be equipped with grills for ventilation if required.

Unitized switching and dimming controls simplify future inexpensive expansion.

In manual boards switching and dimming components are mounted on switchboard frame, entirely independent of cover plates, for time-saving maintenance.

Dead front and rear are completely safe, with no live parts exposed.

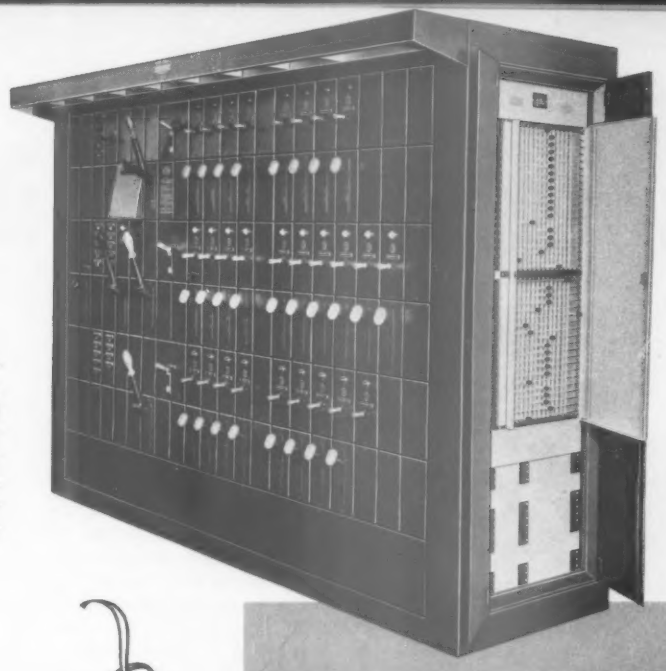
All internal wiring is completed and inspected at the factory. Conveniently located terminal strips need only connection to line, load and controls at the job for operation.

Specially designed dimmer handles tell at a glance if handle is in position for individual operation, or interlocked for group or master control.

Slot closers completely seal the dimmer control plate opening through which the handle operates.

REMOTE SWITCHING MANUAL DIMMING

Complete system includes both stageboard and remote board offstage. Modified remote switching, or full remote switching, can be furnished. The latter is available with multi-scene pre-selective switching. Interlocking dimmers can also be furnished on a group master shaft which can be vertically interlocked for grand master control. Color master levers can be further interlocked on a slow motion wheel drive for operation of a large group of controls. This arrangement also permits cross control so specific groups of dimmers may be raised (brightened) simultaneously, while other groups are lowered (dimmed). Dimmers are easily accessible from rear of board.

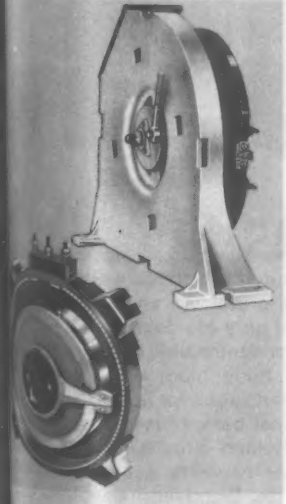


MANUAL SWITCHING AND DIMMING

Self-contained, free-standing unit. Manual auto-transformer type dimmers are easily accessible from rear. Doors in both front and rear can be provided. Manual switching may be direct, or set up on group master control. Group master switches can also be set up for stage master switching. Switches are the silent operating type. Interlocking dimmers on group master shafts can be vertically interlocked for grand master control.

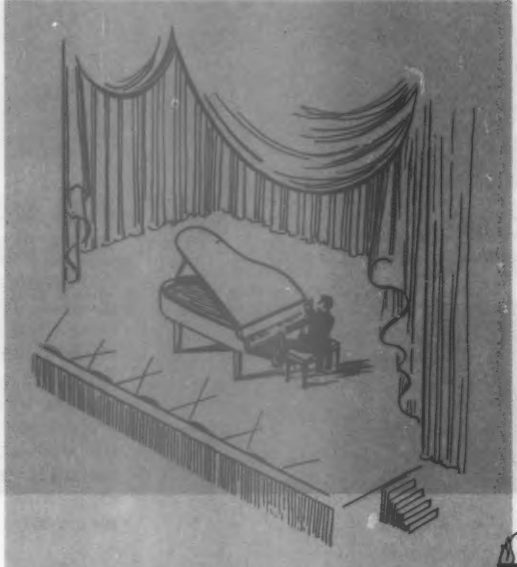
MANUAL DIMMING STAGEBOARD

Self-contained, free-standing dimmer control board. Especially suitable for small auditoriums. Auto-transformer type dimmers, each dimmer controlling all circuits of a color group. Circuit breakers used in dimmer controls give over-load protection, and permit disconnection of dimmers. Branch circuit breakers on each dimmer control can be used for circuit switching. Boards are furnished with or without doors, and with interlocking shaft for master control. Front-connected, and completely accessible from front, these boards conserve considerable space if placed against the wall.



AUTO-TRANSFORMER DIMMER

Most popular type of dimmer. A circular core of laminated transformer iron is wound with insulated copper conductor. A sliding contact makes positive connection with each turn of the winding to insure flickerless dimming. Any load, from a few watts to the full rated capacity of the dimmer, can be controlled. Loads can be added, or taken from, dimmers without affecting dimming characteristics. Available in 1200, 2500, 6000, 6600 and 8000 watts, all adaptable for manual or motor-driven control.



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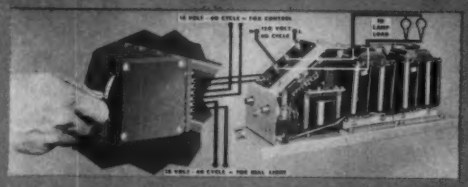
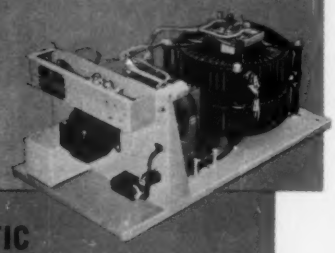




MAGNETIC AMPLIFIER DIMMER

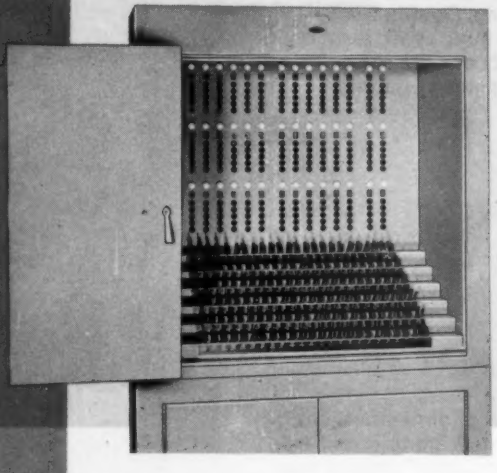
For use only with Remote Switching and Dimming. Components are transformer and reactors with static core and coil, dry type rectifiers and resistors. There are no electronic tubes, relays or moving parts. Response is practically instantaneous. The dimmer is operated by small indicating controllers. Load range for incandescent lamp load is 30-1 ratio.

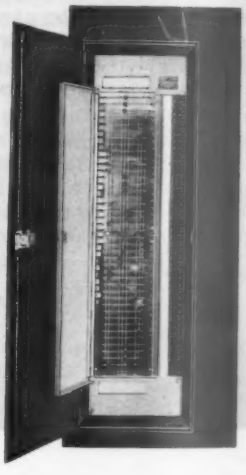
REMOTE SWITCHING REMOTE DIMMING

Console pilot board for remote switching and dimming. Magnetic amplifier type dimmers are used. Motor-driven autotransformer types are also available if preferred. Advantages of this system are pre-set dimming and switching for an unlimited number of scenes. It also permits proportional dimming, scene-to-scene fading at any desired speed, and super-imposing one scene on another. Miniature low voltage intensity selectors guarantee precision intensity control with extremely smooth operation. Because of its small size, the pilot board requires only a minimum of space. This advantage in size allows location of dimming equipment off-stage and, if desirable, division and placement at two separate locations. Dimming control may be extended to one or more stations, or to an additional pilot board.

CROSS CONNECTION PANELS

Usefulness and flexibility of ANY stageboard is multiplied with these panels. Stage lighting circuits can be selectively connected, either individually or in groups. At any time they can be re-connected to control units, either dimmed or undimmed. This allows a maximum of lighting circuits to be used with any number of dimmers. Three types of panels are available, any one integrally built into stageboard, or mounted remotely.





ROTARY SELECTOR SWITCH TYPE

Incorporates heavy duty rotary selector switches, of the load break type, operable under load. Switches can be furnished to provide from 2 to 12 positions. Each branch circuit has an individual rotary selector switch, connected through a circuit breaker, for overload protection and switching control unit. Engraved nameplates identify positions on selector switches and branch circuit connections.

PLUG & JACK TYPE

Has retractable cords and plugs for branch circuit connections; plug-in jacks for dimmed or undimmed control units. Cords and plugs are connected to branch circuit through circuit breakers for overload protection and switching control. Jacks are connected, in groups of two or more, to dimmed or undimmed control units. Two or more cords and plugs can be plugged into control unit jacks for group control of branch circuits. Lights can be provided for indicating when plug-in jacks are energized. Engraved nameplates identify dimmer and load circuits.

SLIDING PLUG & BAR TYPE

Made with horizontal bus bars connected to the branch circuits through a circuit breaker for overload protection and switching control. Vertical bars are connected to switchboard dimmer control unit, or to an undimmed control unit. Slider plugs on horizontal bars have insulated knobs for tightening connection to vertical bars, thus permitting group control of branch circuits. A slotted clear plastic cover prevents accidental contact with live parts. Engraved nameplates identify bus connections.

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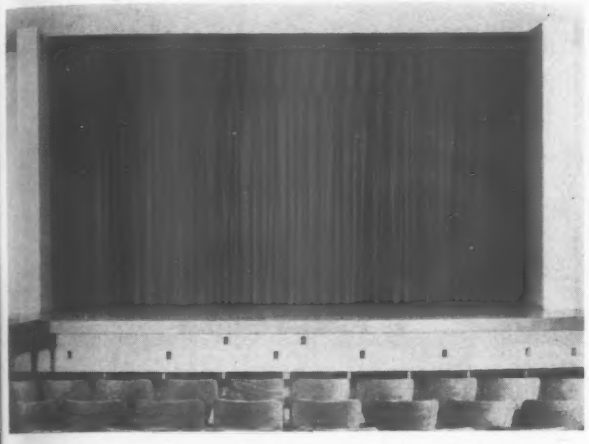
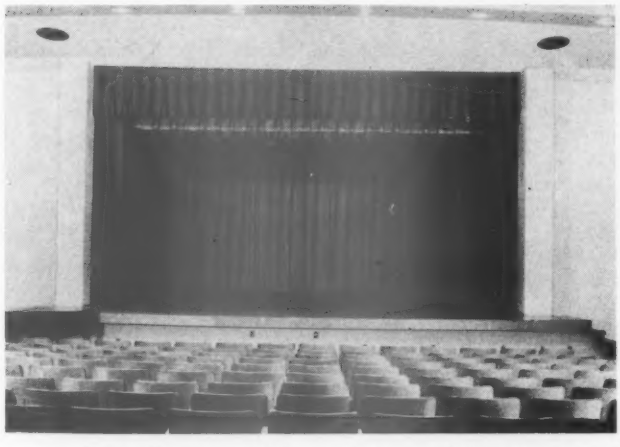
STAGE AND DRAPERIES EQUIPMENT *by Novelty*



Front Curtain & Valance — fabric beige Bouclaire — simple and dignified, rich in fulness.



Rear Curtains, Side Curtains and hanging borders — fabric beige auditorium Repp in 100% fulness.

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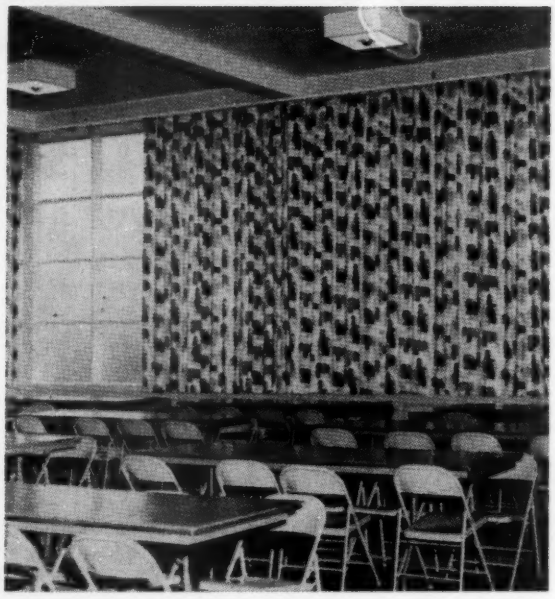
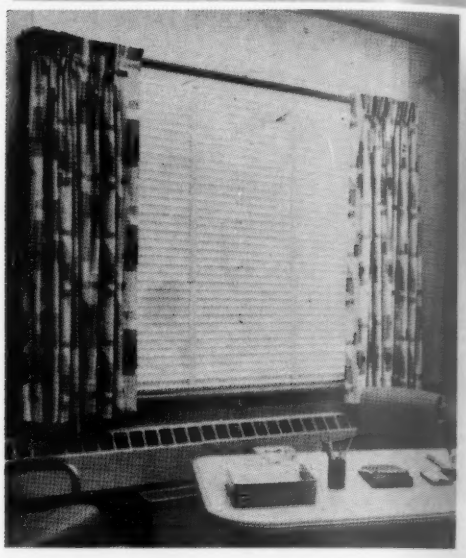
LIGHT CONTROL DRAPERIES
ROOM DIVIDING CURTAINS
OFFICE DRAPERIES



Combination Light Control & Room Darkening Draperies

Room darkening and light control draperies of improved fabrics are operated by a traverse cord on a single track. Custom made to your specifications, both types of drapery are available in a wide range of handsome patterns and solid colors as Novelflex light control and room darkening draperies.



Room Dividing Draperies

Room dividing draperies of inexpensive, sturdy fabr provide convenient method of turning a large area i a number of smaller, useful rooms. Made in many attra tive patterns and solid colors, flame-retardant, strong a sunfast. Some fabrics need only be wiped with a da cloth for cleaning.

Lounge Draperies

The overall pattern on fabric and generous fulness lends beauty and dignity to the area. The above were made and installed in the Coney Island Hospital, Brooklyn, N. Y.

Office Draperies

No matter what your window problem, Novelflex drapery are the solution. Made of a wide variety of fabrics many different colors to blend harmoniously with t decor of your office.

STAGE EQUIPMENT
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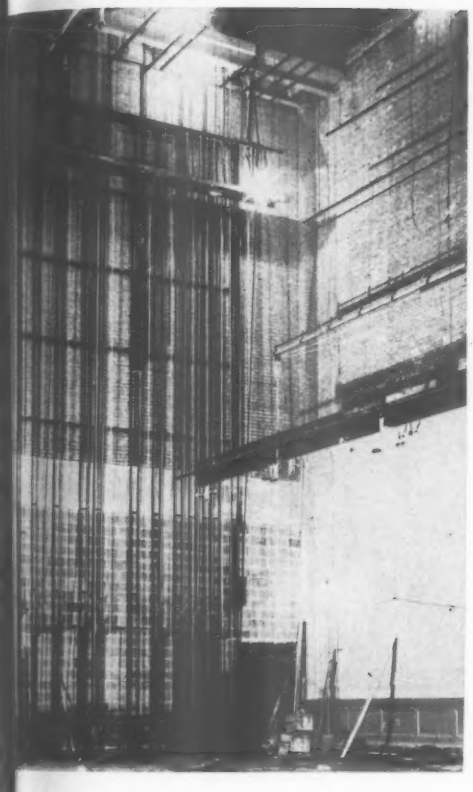
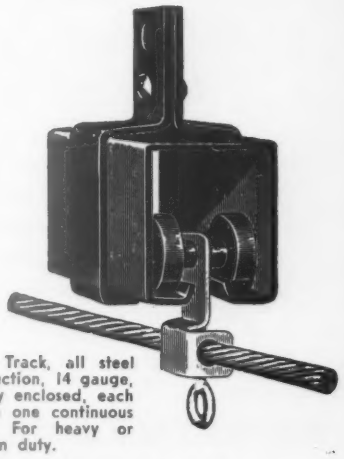


T-Bar Counterweight System

20 sets of lines, seven and five line sets, including trip-type asbestos curtain, made of 80% pure 3 lbs. to square yard wire-inserted pre-sized asbestos cloth. Size of curtain 73'-8" wide x 30'-0" high, hung on eight line double set of rigging.
Installed in James Madison High School, Brooklyn, N. Y.

CURTAIN TRACKS AND MACHINES



Silent Track, all steel construction, 14 gauge, entirely enclosed, each half in one continuous piece. For heavy or medium duty.

Autodrape curtain machine, fully automatic, ¼ h.p. or larger, for curtains of greater dimension.

Light to medium duty Spanotrac, aluminum or magnesium. Recommended for windows and small stages.

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...ude full stage layouts—curtains, cycloramas, stage rigging and light-..., scenery, curtain tracks and curtain control motors.

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Stanchions in brass or chrome. Roping in velour and various fabrics and colors.

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Suspended from ceiling or set on pedestal to highlight and dramatize the presentation.

DRAPERIES AND STAGE CURTAINS

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Board Room, Corona Avenue School, Valley Stream, N. Y. DRAPES—Brown background with green, red and white print. MAHOGANY WALL PANELLING. GREEN LEATHER UPHOLSTERY.

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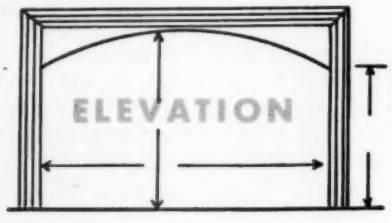
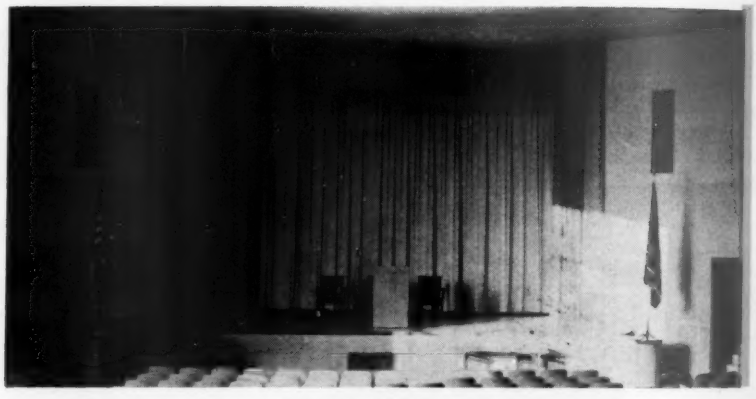
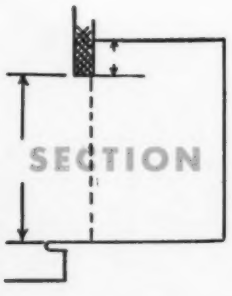
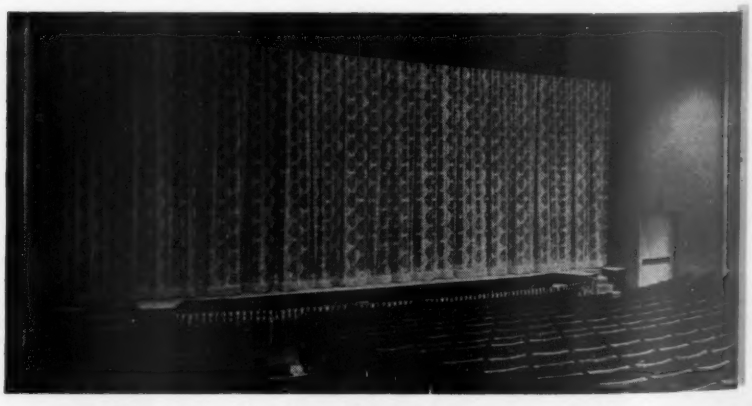


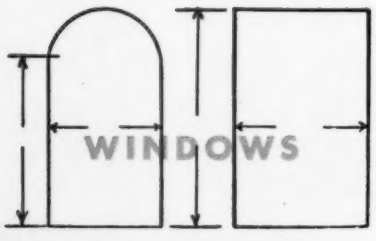


Corona Avenue School, Valley Stream, N. Y.
Front curtain and valance — hand printed fabric.
Rear curtain and sides — plain neutral fabric.





Pickard Theatre, Bowdoin College, Brunswick Me.
Fiberglas patterned material in 200% fulness, Maize, Silver and Gray, trimmed with fringe at bottom. Rich and dignified in appearance.



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Living Facilities on a New Campus

by Robert B. Tallman
Tallman and Tallman, Architects, Ithaca, New York

Mr. Tallman is a graduate of Cornell University's College of Architecture. During World War II he served with the Navy Civil Engineer Corps attached to the staff of Admiral Nimitz, and planned advanced base facilities. Since 1948 he has been a partner with his father, Carl C. Tallman, and is also a lecturer at Cornell University.

IN DEVELOPING a new campus for Ithaca College, the architects' primary effort has been to create a distinguishing character and architectural style wherein the college may further its excellent educational program. With the design of five dormitories and a student union, a progressive and unique architectural style has been established. Sound planning principles insure flexibility for the future expansion and growth always necessary to meet the ever changing needs of an institution of higher education.

Ithaca College is a private, independent, liberal arts and professional institution located in Ithaca, New York. The college might well be considered a prime example of free enterprise in higher education in that, since its founding in 1892, it has operated without outside help of any consequence. Ithaca College has managed to operate in the black solely from tuition income, leaning to corporate and private donors to finance capital outlays.

The college origins were humble and a "make do" philosophy has prevailed. Nonetheless, in the sixty years since its founding, it has grown to its current size and status of 1400 students guided by an excellent faculty of 108 members. Traditionally, the principal curricular offerings have been music, drama, speech, health and physical education. In the 1940's a department of radio (now the department of television and radio), a division of physical therapy, a department of business and departments in liberal arts were added to the curriculum. In the early 1950's the College of Arts and Sciences

New campus development program for Ithaca College has a five year timetable. Campus is designed for 2000 students.

0 50 100 200 300
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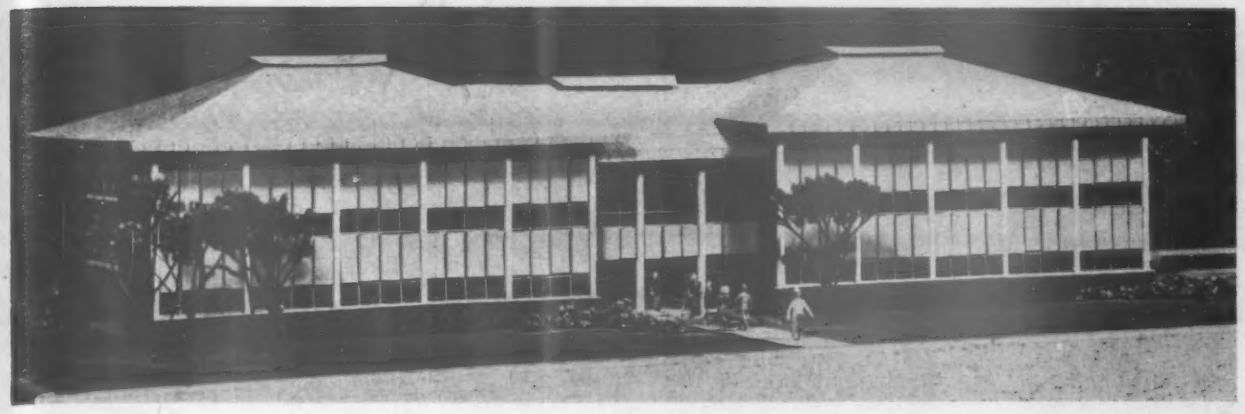
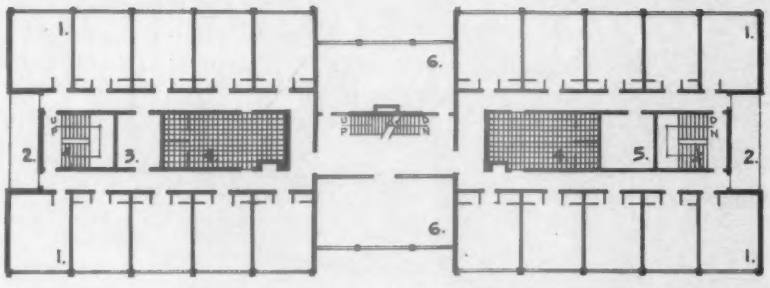
2. MEN'S DORMITORIES
3. INFIRMARY
4. STUDENT UNION
5. MUSIC BUILDING
6. LIBRARY
7. CHAPEL
8. DRAMA, RADIO + TV BUILDING
9. SCIENCE BUILDING
10. ARTS BUILDING
11. ADMINISTRATION
12. LECTURE HALL
13. GYMNASIUM
14. FIELD HOUSE
15. ATHLETIC FIELDS
16. N.Y.S. ROUTE 96-B
ITHACA COLLEGE CAMPUS
SOUTH HILL, ITHACA, N.Y.



Dormitories are designed on an intimate scale to avoid institutional feeling. Typical dormitory second floor, plan at right, has the following areas: 1. study rooms, 2. balconies, 3. service room, 4. bathrooms, 5. laundry room. 6. reading lounges.



was fully developed in keeping with ever expanding educational needs. At present, Ithaca College includes the School of Music, the School of Health and Physical Education and the College of Arts and Sciences. Careful choice of faculty, high educational standards and a progressive educational policy have generated the college's high academic reputation.

Like many another modern educational institution, Ithaca College has outgrown its present facilities. Students attend classes in renovated churches, residences, and theaters in downtown Ithaca. Rarely are the facilities convenient to each other and bus service is often necessary to convey students from dormitories to academic areas. As a result, the college has found it extremely difficult to establish a closely knit college community.

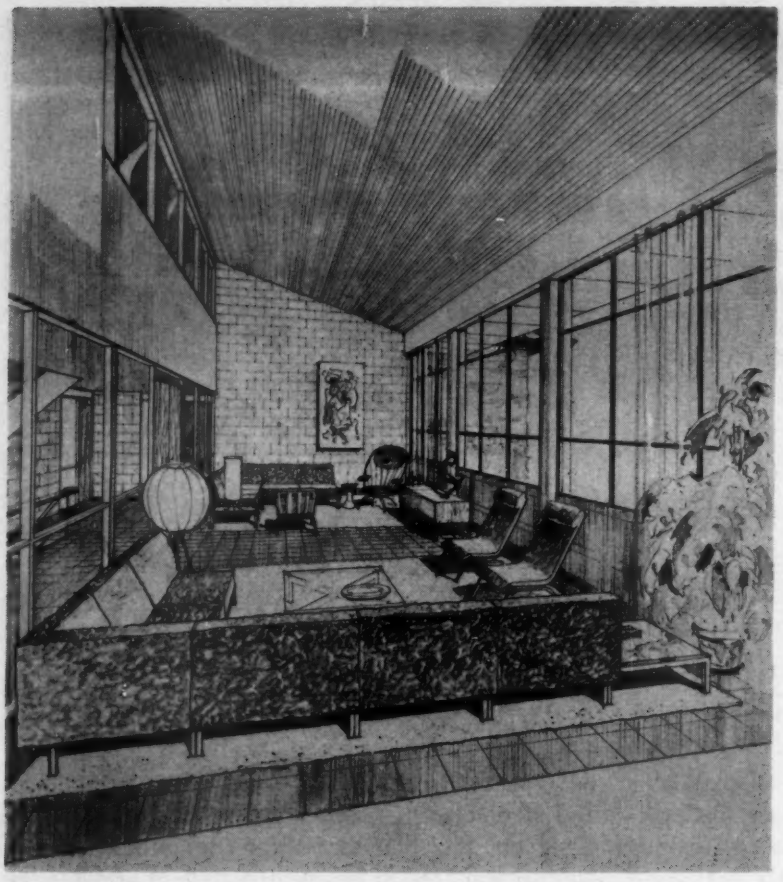
The new campus development program has a five year timetable. During this time 15 million dollars will be expended in planning, design and construction of approximately twenty-one buildings, including residential and academic facilities. Present enrollment is 1400, but a realistic projection for the future would be about 2000 students. This is the basis for design of the new campus. The dormitories will house 1200 students, but adequate provisions have been made for future expansion of dormitories, fraternity and married student housing in keeping with the original design concept.

It goes without saying that a development of this magnitude and importance can be difficult for all concerned, but it is significant that the architects at no time felt pressure from the numerous persons and departments cooperating in the project. The designers' freedom to interpret requirements was an important factor behind the style of architecture which evolved.

Site Development

A splendid campus site of 208 acres to the south of Ithaca was acquired several years ago. Located on a plateau high above the city, the site affords commanding views in all directions. To the north is the City of Ithaca, with famed Lake Cayuga just beyond. To the east and west the view is of wooded hills and valleys, and to the south a wooded hillside forms a backdrop for the campus. The site itself slopes down to the north and is partially wooded. Approach is by automobile from a main traffic artery, and the access road passes through a buffer zone of terraced athletic fields before arriving at the campus proper.

Three principal areas of function influenced site development. First was an area for both academic and public needs, extending between the drama and television building and the athletic complex. These buildings will be used for public presentations as well as for classrooms. By placing the buildings nearest to the access road, traffic and parking problems have been minimized. The second area of consideration was the academic section. It is located in the middle of the site and has the best view of the lake. The third area was reserved for



Dormitory reading lounge has pitched ceiling with clerestory windows. Large expanses of glass encompass the view.

residences and occupies the quietest location on the site, farthest from the major traffic. This location is particularly in keeping with the quiet "fraternity-like" design approach to the dormitory buildings themselves.

The entire campus is circled by a circumferential road providing services to all buildings and access to major parking zones. The site interior is retained for the pedestrian, and the sculptural pattern and placement of buildings create a variety of open spaces and confined walks designed to enhance building relationships and to emphasize the view beyond.

Dormitory buildings will be constructed in two phases. The first phase of dormitory buildings and the student union is presently under way with completion scheduled for September, 1961. It is hoped that the second phase, which includes an academic building and five additional dormitories, will be started in late 1961. Student housing will thus be increased to accommodate 1200.

Housing will consist of five dormitories for men and five for women. The buildings are placed to create a central court or green area for each grouping of five dorms. The green area opens to the student union and beyond to the academic buildings. It serves as the principal pedestrian access to the remainder of the campus. The dormitories are further separated by another green buffer zone which will serve as an informal play field. The dormitories are developed on an east-west axis with the general slope and face the view. The continuous slope of the site permits an unobstructed vista from each dormitory.

Dormitory Features

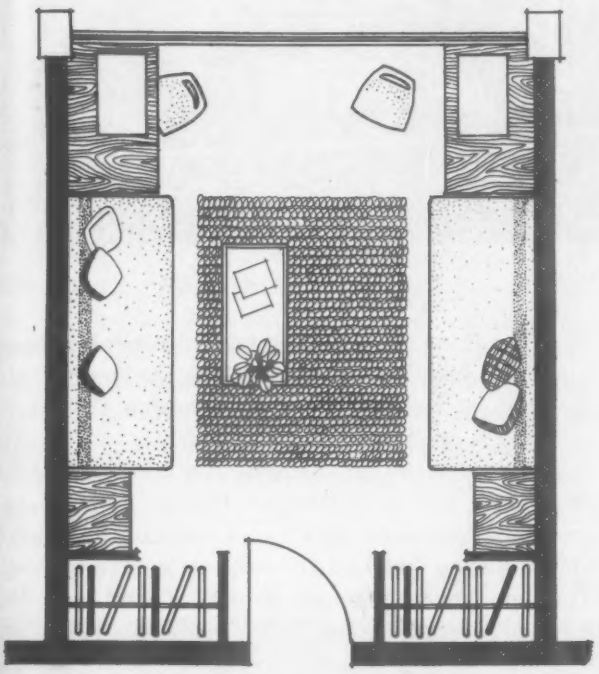
All students will occupy double rooms, 12′2″ x 15′4″ in size, with individual built-in wardrobes, dressers, desks and bookcases. Interior walls of the rooms are painted concrete block and floors are vinyl asbestos tile. All built-ins are constructed of natural finish maple. The exterior wall has sliding aluminum window units opening the entire width of each room.

A typical floor is divided into two sections, each consisting of ten rooms housing twenty students. The twenty students share one washroom facility and each floor (forty students) is equipped with a coin operated laundry and a service room for linen storage and janitor supplies.

The dormitories have two three-story wings for student rooms, connected by a link two stories high. The connecting link provides main entrance to a

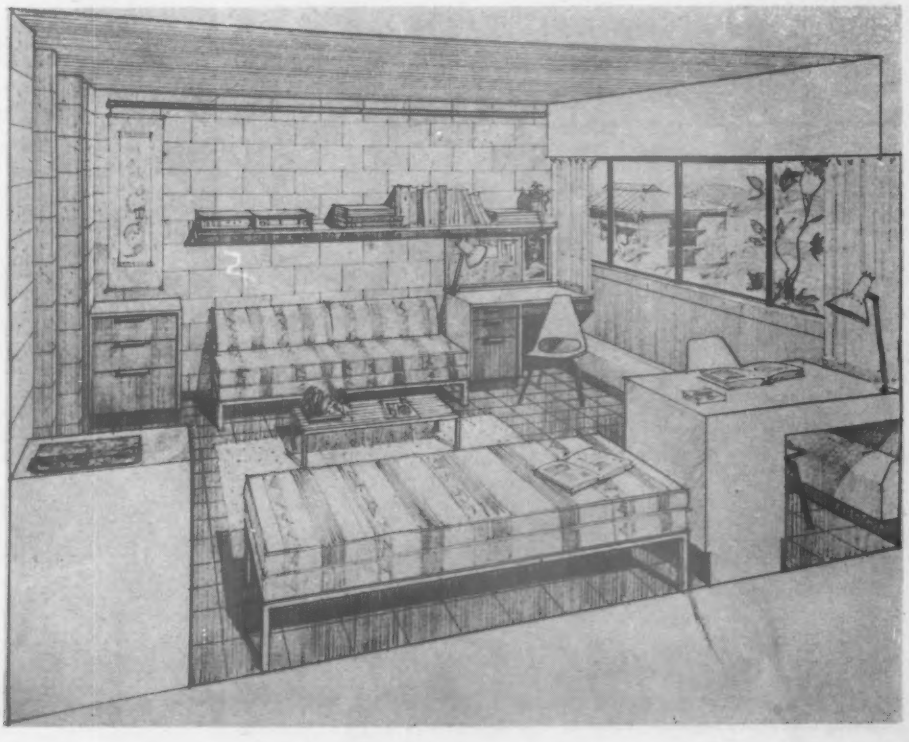
building and houses mechanical equipment at the first floor level. Two reading lounges with pitched ceilings, wood paneling and large glass areas to encompass the view are located on the second floor of each building. A corridor, for access between student rooms, is situated under the roof peak of the connecting link at the third floor.

Four of the five dormitories are similar in design. For the fifth, which culminates the group sculptural pattern, the sloping site permits an extra floor below the first floor. This area, approximately 50′ x 65′, will serve as a large recreation room, with television, game and social areas and facilities for small dances, parties and faculty teas.



The dormitories are not the large, multi-story buildings so often the case in new dormitory construction. Since the site offered little confinement in terms of space, it was felt that the open approach, taking full advantage of the tremendous views, was a practical and logical design solution. The desire of the administration for an intimate, "fraternity-like" student living facility was readily endorsed. This desire was based on the theory that a student forms lasting friendships and a more permanent bond with the college if he is part of a smaller group.

Various architectural expressions and approaches were considered in the design problem. A modern, progressive approach seemed to be in keeping with educational policies of the institution. As the budget was tight, maximum function was a prime consideration. The construction of an entire campus, a permanent home for an institution, demanded an architectural style which would not become obsolete and outdated overnight. Past architectural styles were rejected as impractical and sacrifices to function, and because the cost of reproducing such styles would probably be prohibitive. Esthetically, a friendly approach was adopted to create a humanly monumental and lasting character but avoiding the institutional feeling. In addition, the tremendously powerful site demanded a design ap-



All dormitory student rooms are planned for double occupancy.

Student Union at Ithaca College is located near the dormitories.

proach which blended with nature in color and materials and complemented the beauty of the surroundings.

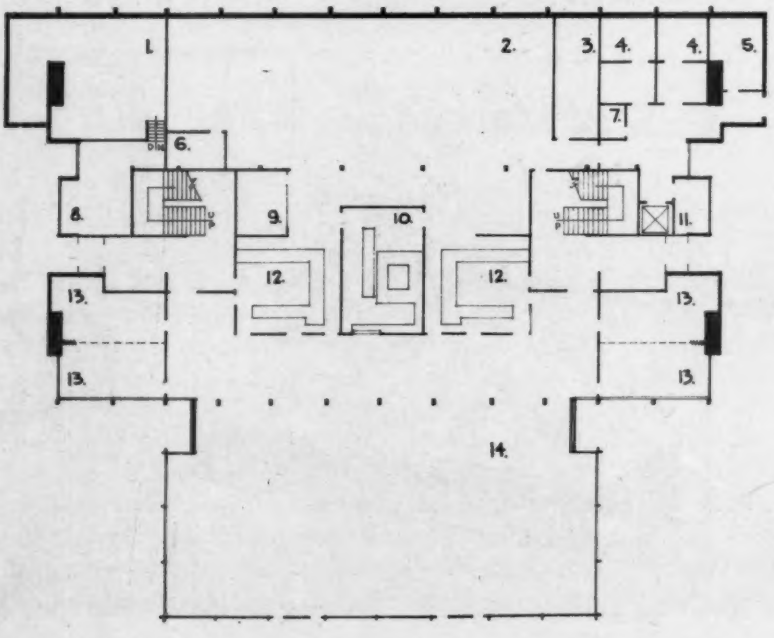
Exterior Details

Exterior design of the dormitories combines an extensive use of stone with aluminum roof and wall panels. The structure is basically a precast concrete frame. Exterior columns are exposed to provide a well resolved feeling of structure. Windows are aluminum and selected to make the most of the view with a minimum of maintenance. Wall panels reflect an indented diamond pattern and match the color of the roof. A raised batten seam aluminum roof with wide overhang provides the design culmination and completes the impression that each building is an integral unit in itself.

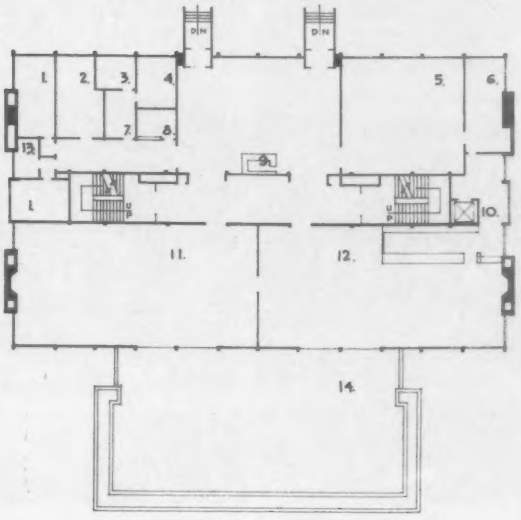
The dormitories are being built at a cost of $14.00 per square foot or $2,900 per student. Both figures are quite reasonable in view of constantly increasing building costs, and are well within the budget. The amounts do not include cost of land, site development and architect's fees.

The budget for the entire campus was limited and an early design consideration was to eliminate any costly duplication of facilities. One of the prin-

First floor of the Student Union houses service areas and dining rooms.



1. BOILER ROOM
2. FOOD PREP.
3. DRY STORAGE
4. EMPLOYEES RM-S
5. INCINERATOR RM.
6. BAKERY DRY ST.
7. JANITOR
8. POWER & UTILITY
9. MANAGER'S OFFICE
10. SCULLERY
11. COMPRESSOR RM.
12. SERVING AREAS
13. DINING ROOMS
14. MAIN DINING RM.



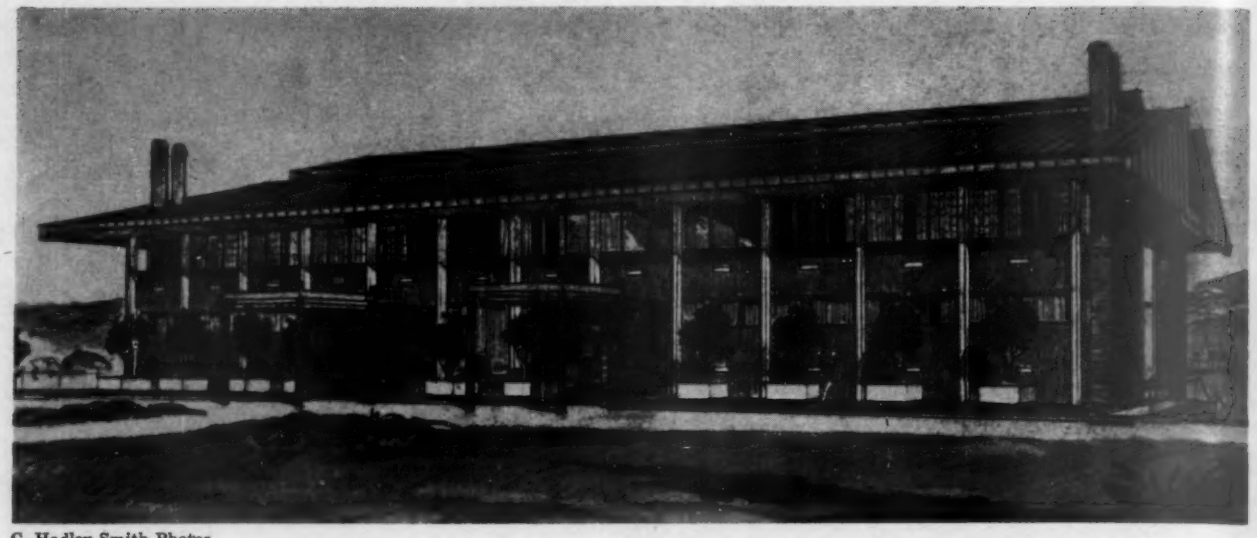
1. TOILET ROOMS
2. BARBER SHOP
3. OFFICE
4. DIRECTOR'S OFFICE
5. CAMPUS STORE
6. STORAGE
7. SECRETARY
8. COAT CHECK ROOM
9. INFORMATION
10. SERVICE
11. STUDENT LOUNGE
12. SNACK BAR
13. JANITOR
14. TERRACE

Second floor of the Student Union has administrative areas, lounge, snack bar and barber shop among its facilities, as well as a large terrace.

cipal supports of student living is the dining facility. Consolidation of this important function as part of the student union resulted in several benefits for the campus development. First, by eliminating dining from the dormitories their compact design became practical and economical. Secondly, with the dining function as an integral part of the student union, a more efficient operation resulted in terms of initial costs of construction and equipment and of operating personnel. Lastly, inclusion of the dining activity within the student union gives the building the importance it deserves.

Instead of operating as an extra social hall for student coffee hours, the student union has become the living center of the residential campus. With the exception of small reading lounges in the dormitories, the student union serves all social and living functions for the 1200 resident students. One large

Student Union is located on the campus between two clusters of dormitory buildings. Structures are at quiet portion of the campus.



C. Hadley Smith Photos

Student Union is being built at a cost of $17.40 per square foot.

kitchen with two cafeteria lines accommodates all students at all meals. A snack bar provides between-meal food service. Large recreation and reading lounges, many with massive stone fireplaces, are designed to be versatile enough to handle intimate faculty teas as well as large social functions. Music lounges, a campus store, student activities center, and a barber shop are also included in this building.

The student union is related to all facets of college life. It has been designed and located in the overall plan as a transition link between student living and academic areas and serves both areas and the entire campus equally.

The student union is designed to conform to the style of architecture initiated by the dormitories. A pitched roof is maintained with similar aluminum batten seams. Extensive application is also made of natural stone and the exposed precast concrete structural system is repeated. Variety is introduced in the panels with a stucco treatment. Four stone masses on the side walls support the fireplaces and exposed brick flues pierce the roof. The approach is altered somewhat, in keeping with the function of the building, but the style of architecture is maintained and improved by the contrast of details.

Interior finishes also vary according to the rooms. Generally, the lounge areas are wood paneled (either birch or walnut) with a stone fireplace and extensive use of glass. Floors are wood or vinyl asbestos tile in the lounges. The cafeteria has a quarry tile floor, wood paneling and large glass areas. The quarry tile carries through into the kitchen where walls are glazed structural tile. Circulation areas have glazed tile wainscots, and utility areas, offices and the campus store have, in general, painted concrete block wall finish and vinyl asbestos floors.

The student union is being built at a cost of $17.40 per square foot. This price includes all built-in equipment plus kitchen and cafeteria equipment.

It is only rarely that an architect or college administration has the opportunity to develop an entire college community. The extensive cooperation afforded the architect by the faculty and administration of Ithaca College was a decisive factor behind the success of the project. It is hoped that the conception of a distinct and imaginative architectural style will always be a source of pride to the faculty and students of the college.

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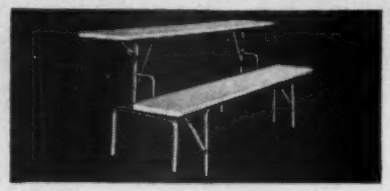
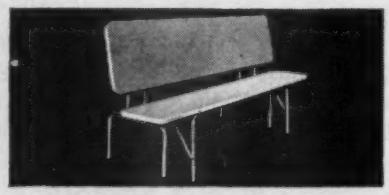
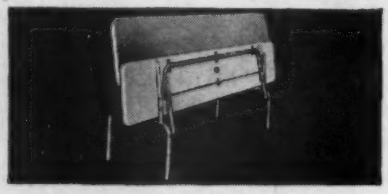
NEW HOWMATIC "C" TABLE-BENCH



1—A positive lock secures the HOWMATIC "C" in this cafeteria table-bench position *automatically!* Fingertip pressure releases the accessible lock at the table's end. *The HOWMATIC "C" converts to bench with angled backrest instantly!*



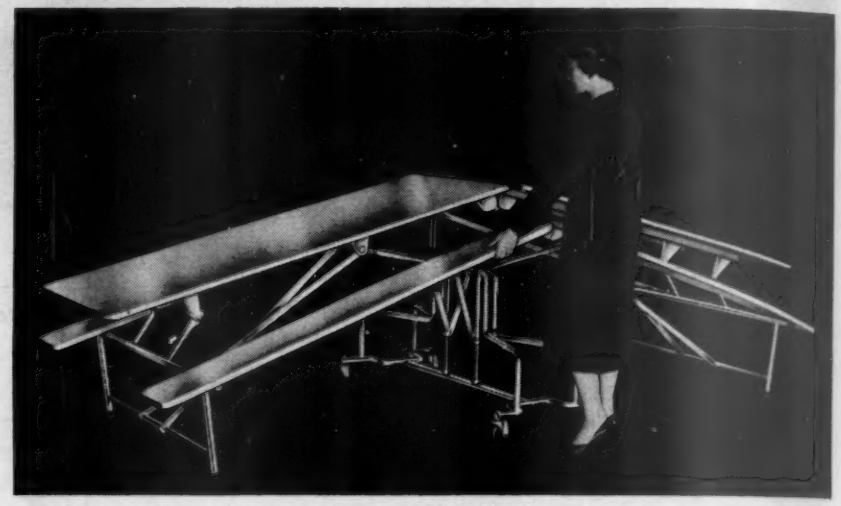
2—In this auditorium bench position, the HOWMATIC "C"'s backrest is low; little children see over it easily. 6 ft. model seats 4-5 people; 7 ft. unit seats 5-6. (Available with prayer kneeler at slight extra cost).



3—Compactly folded, the HOWMATIC "C" stores in little space. Also available with 3" swivel casters (at slight extra cost), it quickly rolls out of the way.

Benchless "cousin" to the HOWMATIC "12", this HOWMATIC "T"'s Unique Floating Action makes the unit almost effortless to open or close. The center, castered legs touch the floor at all times. The 4 corner legs touch the ground only when the HOWMATIC "T" is fully opened. This anchors it firmly where placed, eliminates opening and closing drag, makes the HOWMATIC "T" almost effortless to operate.

New HOWMATIC "12" Bench and Table opens or folds in one, easy motion!



THE new HOWMATIC "12"* Bench and Table opens or folds in one, easy, automatic motion! Unique Floating Action keeps the four corner legs off the floor during opening and folding. Fully opened, however, these legs grip the floor, anchoring the HOWMATIC "12".

Even in small areas, the HOWMATIC "12" is compact and maneuverable. Folded, its four large swivel casters make the unit easy to move in any direction. This special maneuverability means more units can be efficiently stored in a given area.

Table and bench surfaces are completely exposed for easy cleaning even after folding. This feature—exclusive with the HOWMATIC "12"—*cuts cleaning time and costs up to 50%*, speeds conversion of multi-purpose rooms.

Design simplicity provides maximum comfort without leg obstruction; the HOWMATIC "12" seats 16-20 persons.

*Pat. Pending

(Inset) Converts to bench with backrest instantly!

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Roomy enough for 8-10 people, the HOWMATIC "6" is ideal for small and medium feeding operations. Easily operated by a woman. With table folded and *one* bench open, it's a bench with backrest ideal for perimeter seating, circular arrangements and assemblies. Rolls easily on casters.

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2. **new HOWMATIC "C" Table-Bench**
3. **new HOWMATIC "T"**
4. **HOWMATIC "6" Dual Bench and Table**
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Steel, pedestal leg folding table

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New Savings! Convert to Chinet molded paper service and end the problem and expense of dishwashing help. Also eliminate sanitation problems, the initial and replacement costs of expensive tableware and the need for elaborate equipment. These savings will far outweigh the cost of paper service itself.

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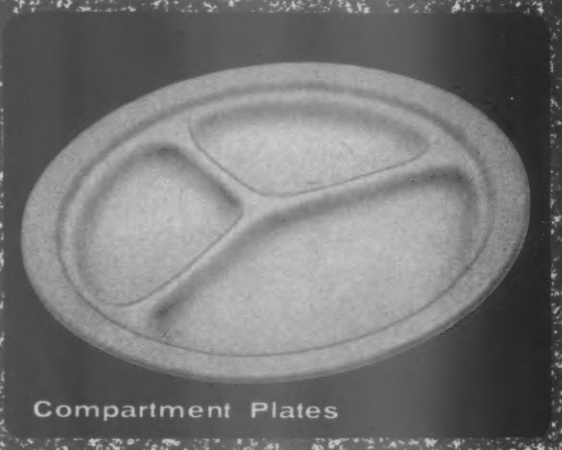
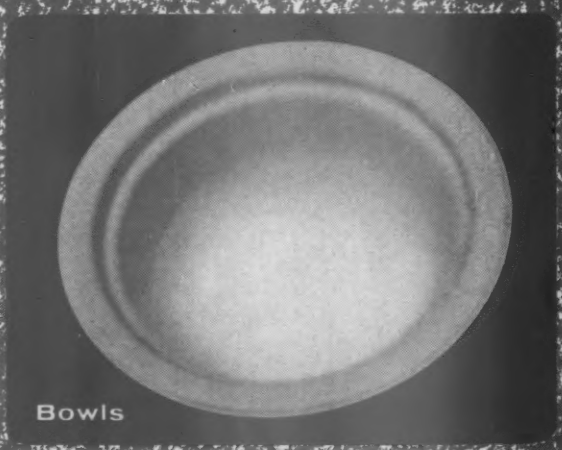


Compartment Plates

Platter-Plates



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The plastic serving tray guaranteed never to warp.

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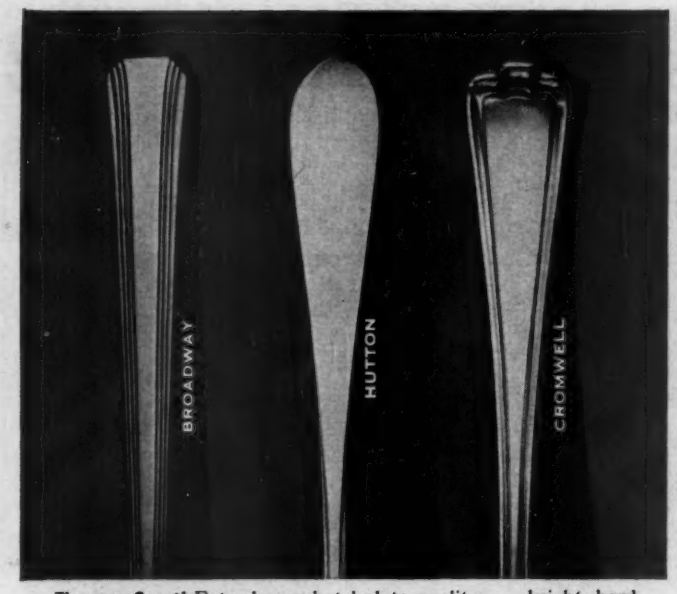
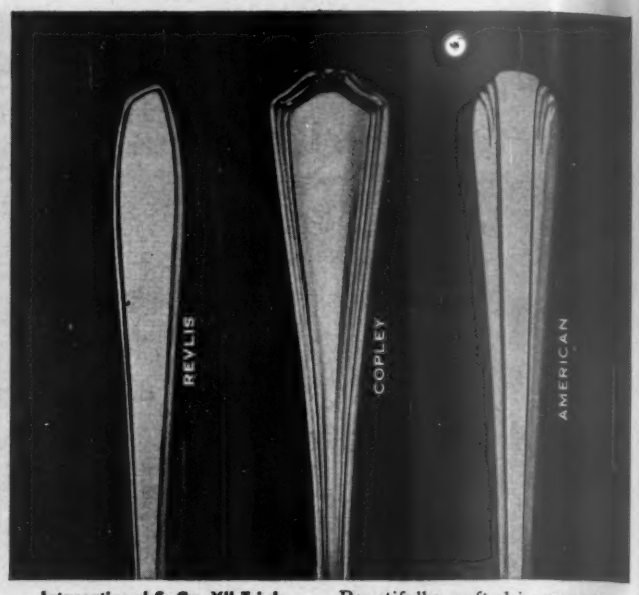
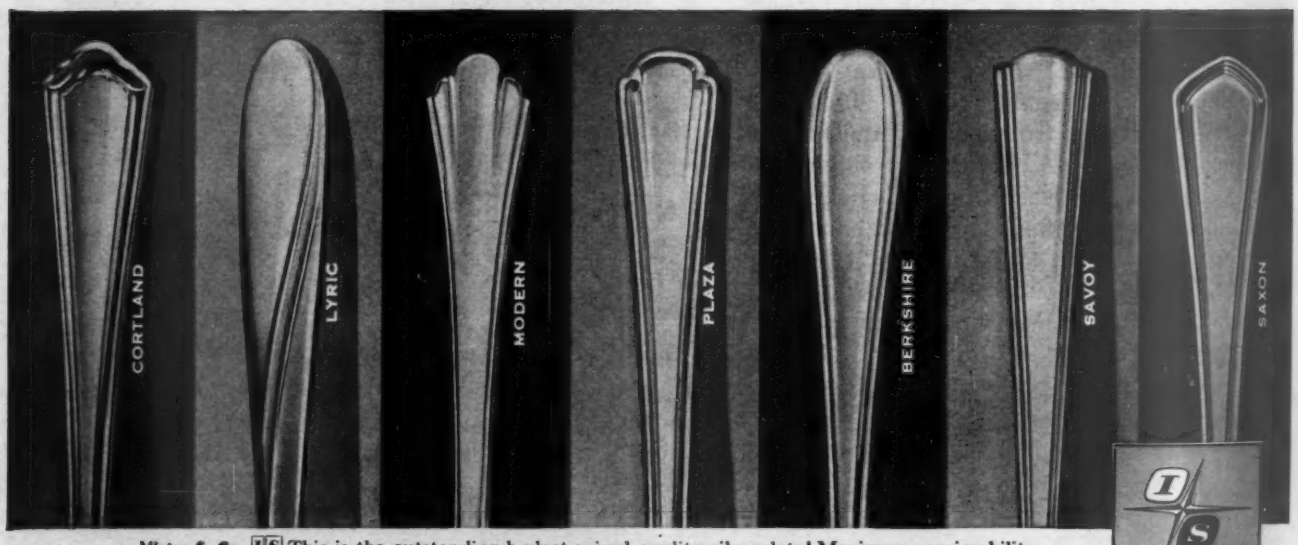


The very finest! Extra-heavy hotel-plate quality . . . bright, hard, heavy silverplate with superb design, balance and finish. These patterns are used in great hotels and restaurants everywhere.



International S. Co. XII Triple . . . Beautifully crafted in a manner becoming the better restaurants. This fine silverplate combines many unique construction features with a rich appearance.

The wise choice in tableware is that which suits your décor *and* your economy. International designs patterns and has fine qualities to meet both these specifications. Choose the pattern—right for you—from those shown here and from many others.



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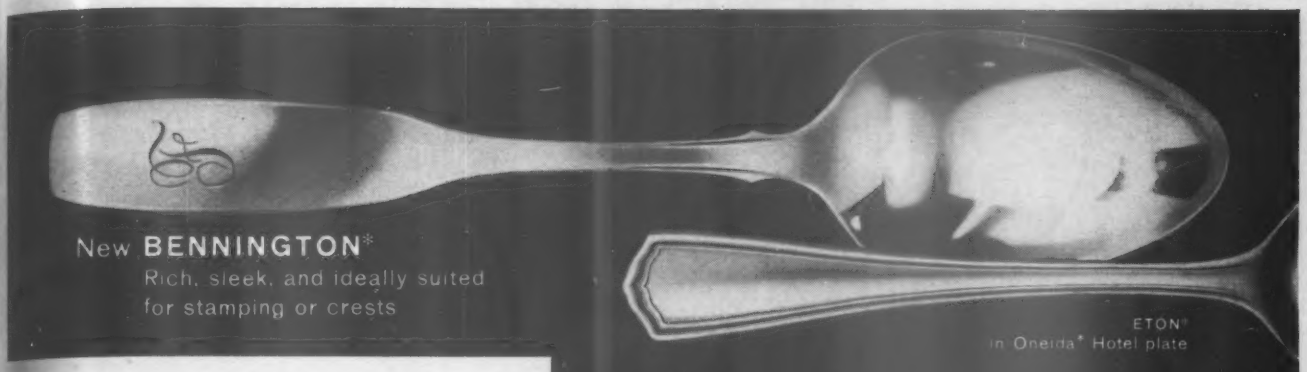

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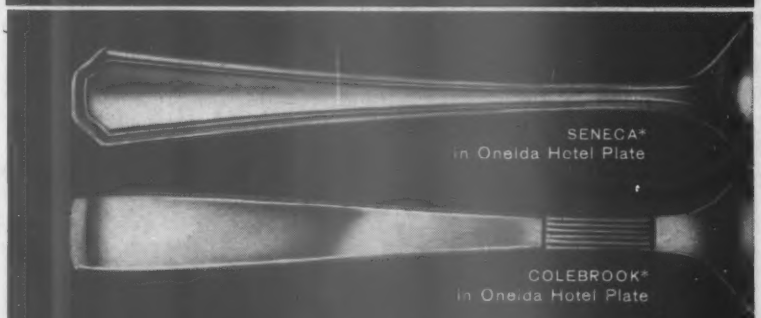
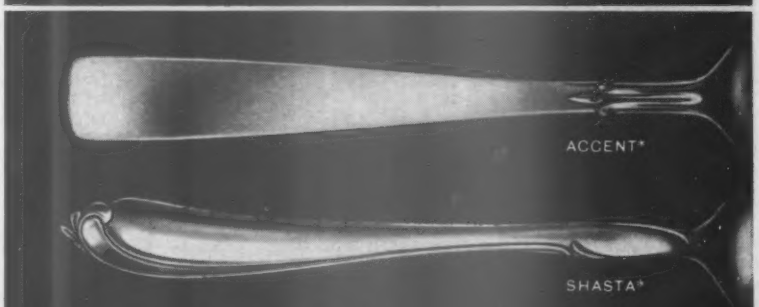


SENECA* in Oneida Hotel Plate

COLEBROOK* in Oneida Hotel Plate

Distinctive, heavyweight silverplate



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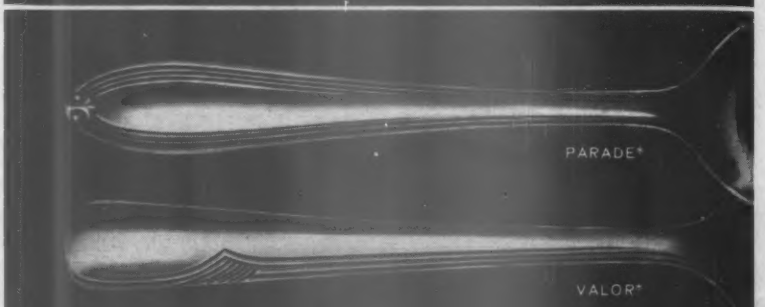

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THE TC-1 Trim and sleek, Metwood TC-1 model has been selected by many architects because it is compatible with modern architectural treatment. Anodized, "T" type aluminum moulding. Apron of full welded steel channels. Legs crafted of 1¼" tapered steel tubing, beautifully chrome plated. Equipped with riveted steel bracing that fits solidly into automatic lock. Top of 1/16" Panelyte plastic laminate on A-B grade fir plywood.

TENNIS TABLES TOP: The TC-106, one piece top with reinforced steel channel apron and 6 tripod detachable legs. BOTTOM: The T-52, one or two piece with full steel channel aprons and legs designed to lock same as folding tables. Plywood or masonite tops . . . sealed, sanded and lacquered.

ROUND TABLES Top surfaces of 1/16" high pressure plastic on ⅝" Douglas fir plywood, ⅛" tempered masonite on ⅝" Douglas fir plywood . . . in patterns, oil wax stain, or clear lacquer. 48", 60" and 72" diameters.

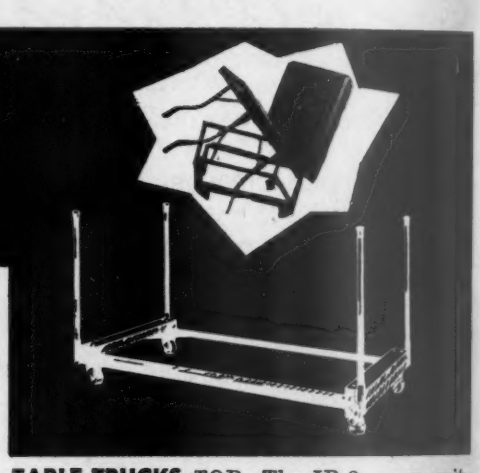

TABLE TRUCKS TOP: The JR-3 . . . permits just one man to load and unload tables WITHOUT LIFTING . . . eliminates the 2nd man! BOTTOM: The JR-1 for either flat or edge stacking of 12 to 14 tables up to 8' long.

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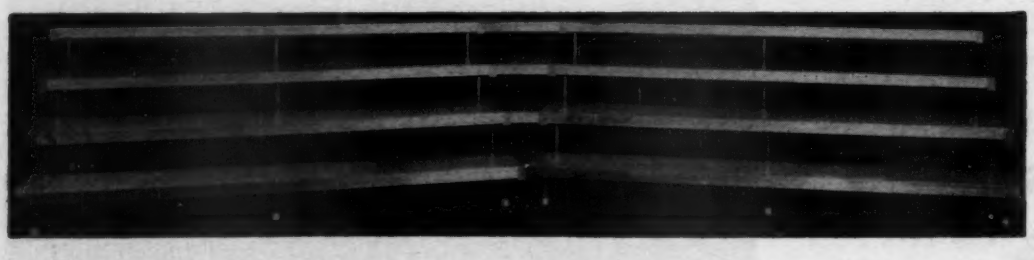

The ONLY Folding Platforms with a Perfect Connection! With an entirely new principle, employing no clamps . . . afford an absolutely flush connection that means extra rigidity. Unusual flexibility for choral, orchestra, theatrical, and educational usage. Many, many practical variations possible with the 96 x 14, 96 x 34 and the 96 x 48 units.

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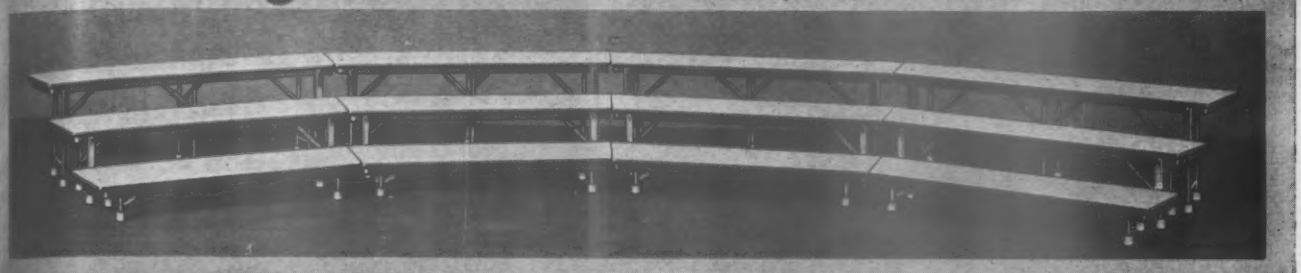
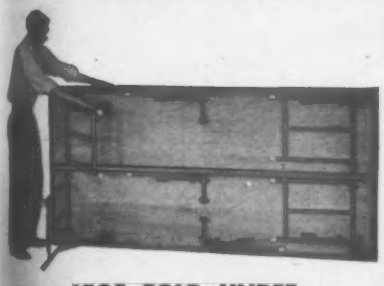
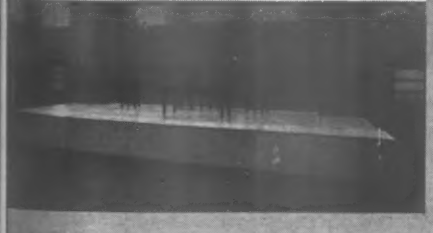
Mitchell PORTABLE FOLDING STANDS





LEGS FOLD UNDER FOR EASY AND COMPACT STORAGE

Mitchell Folding Stands have been built for ease of handling with compact storage in mind. As an example, one person can easily stack and store a complete Band Stand for 120 musicians in an area only 4′ wide, 8′ long and 6′ high. Notice how the legs fold flat against the underside of top and do not extend below apron.



EASY TO SET-UP 1, 2, 3 or MORE LEVELS BAND, ORCHESTRA, CHORAL and DRAMATIC GROUPS

They're sturdy, they're safe, they're easy to handle! Most importantly, they're built stronger to last longer . . . with husky folding legs of tubular steel, and ¾″ temper-treated permaboard tops, rigidly reinforced with specially designed steel channel aprons. The top size of one standard unit is 4′ x 8′. All heights start with 8″ and increase by 8″ rises to form the step-type set-ups illustrated.

MITCHELL ONE-LEVEL STANDS

On the left is a one-level set-up installed in a gymnasium. This arrangement is particularly flexible; for with these standard 4′ x 8′ units, a complete platform can be provided for groups, or just a few units used for speaker's platforms or runways. The versatility and portability of these folding stands make them the practical answer for countless uses in schools, churches, hotels, and lodges, plus many other public and private applications.

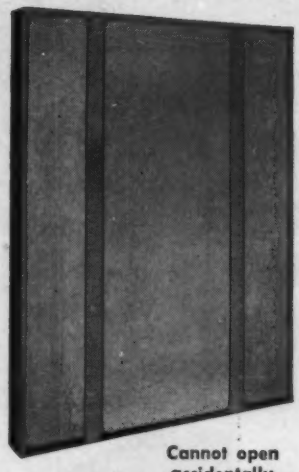
MITCHELL Portable CHORAL STANDS

The complete Mitchell Choral Stand shown at the top of the page is composed of four sections, like the one pictured above. Each tri-level section has a tapered design, producing the popular semi-circular arrangement preferred for Choral Group performances. For standing groups, the units are available in 18″ width tops; 36″ width tops for seated groups. All units and sections lock and clamp securely together for extra safety and added rigidity. Both standing and seated group choral stands are also available in four elevations.

ONE UNIT ERECTED

ALL GENUINE MITCHELL PRODUCTS HAVE: EXTRA STRONG WELDED TUBULAR STEEL LEG ASSEMBLIES AND SIMPLE FOOLPROOF FOLDING FEATURES

WALL-TYPE PORTABLE, FOLDING TABLE and BENCH SET

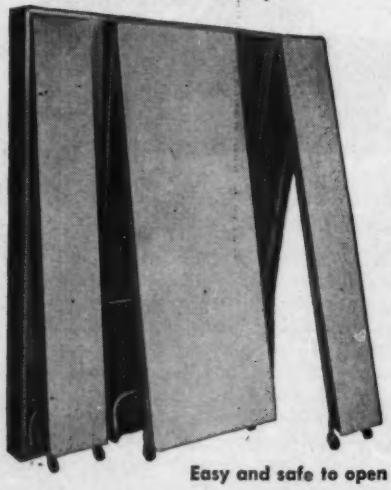


Cannot open accidentally

DOUBLE-DUTY
Attached or Removed from Wall
DOUBLE-CAPACITY
Seats 20 Children
DOUBLE-USE of area

Portable, roll them anywhere

DOUBLE-QUICK
Set-up and Removal
DOUBLE-DURABLE
Built for long life
DOUBLE-SAFETY
Gap between top surfaces for safe opening and sanitation



Easy and safe to open

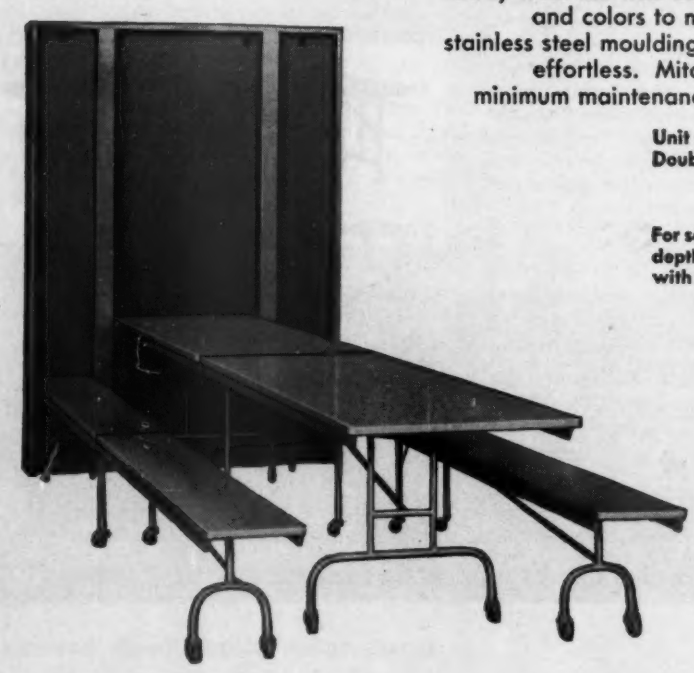
Mitchell TABLES and BENCHES FOLD-O-LEG Doubler

Compactly folded and securely locked into wall cabinet when not in use.. yet, available in a moment. DOUBLER TABLES and BENCHES are separate, portable units that can be used individually either attached to or rolled away from the wall cabinet. Plastic table and bench tops in many patterns and colors to match your decor. Edges of tables and benches protected with stainless steel moulding. Table opening and closing is smooth and almost effortless. Mitchell features assure greater safety . . . easier operation.., minimum maintenance and long trouble-free service.

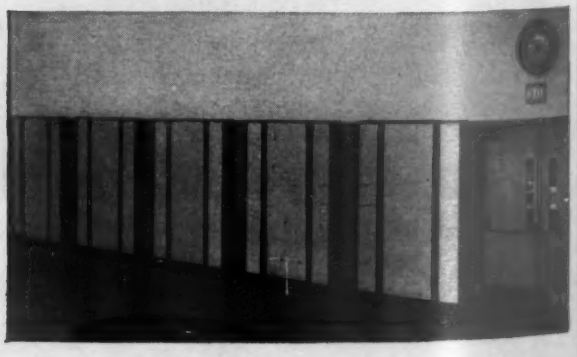
Unit sizes: Doubler Table . . . . . 13' 10" long, 30" wide, 29" high
Doubler Benches . . . . . 13' 10" long, 12" wide, 18" high

Other Table and Bench heights available

For set-in-wall or against-wall installation. Also, cabinets of double depth — two tables only — or two tables and four benches. Cabinet with Doubler Table only if desired.



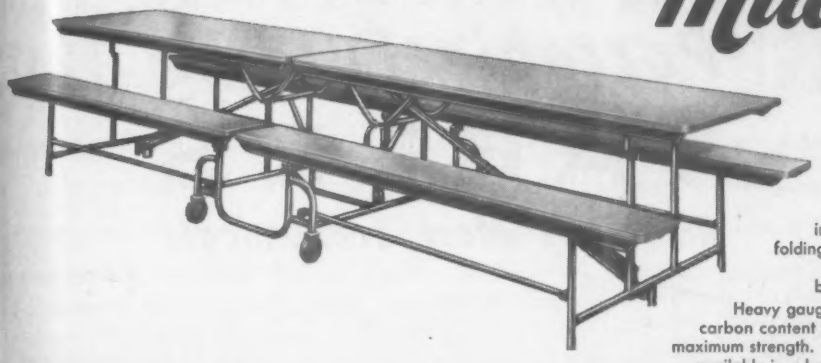
Tubular steel folding legs are rigid pedestal arch design. Folding mechanism is foolproof and wearproof. All metal parts handsomely finished in long wearing Light Bryce Beige colored enamel including wall cabinet.



MITCHELL MANUFACTURING CO.

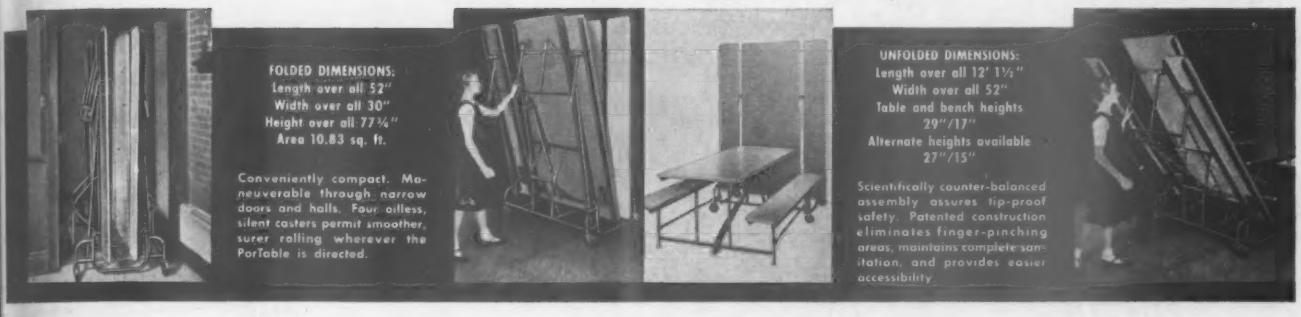
the newest . . . the finest . . . the only

Mitchell FOLD·O·LEG PorTable



Only two smooth and simple movements required, to lower the Mitchell PorTable . . . effortlessly, positively . . . into its full open position. This new concept in folding tables combines extreme versatility with practical utility, offering maximum benefits through multi-purpose room use.

Heavy gauge, long tempered steel channel and high carbon content tube supports of the under structure, provide maximum strength. High Pressure Resilyte Plastic Laminate available in a broad selection of Patterns and Hardboard Tops.



FOLDED DIMENSIONS:
Length over all 52"
Width over all 30"
Height over all 77¾"
Area 10.83 sq. ft.

Conveniently compact. Maneuverable through narrow doors and halls. Four oilless, silent casters permit smoother, surer rolling wherever the PorTable is directed.

UNFOLDED DIMENSIONS:
Length over all 12' 1½"
Width over all 52"
Table and bench heights 29"/17"
Alternate heights available 27"/15"

Scientifically counter-balanced assembly assures tip-proof safety. Patented construction eliminates finger-pinching areas, maintains complete sanitation, and provides easier accessibility.

Mitchell FOLD·O·LEG UniTable

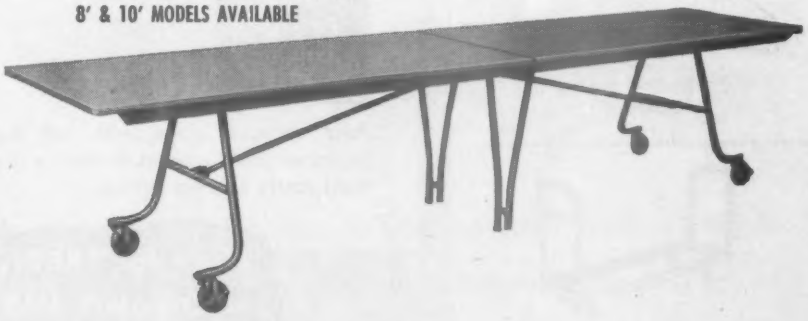
Here, in the all-new Mitchell Fold-O-Leg UniTable is the one answer to a more simplified and efficient method of table-space planning, providing multi-purpose room use of almost limitless combinations. With a wide selection of Quality Plastic Laminate tops in designer-colors and patterns, new opportunities are released to mix-match harmoniously in any room decor. Carefully constructed — without compromise or substitutions — the Mitchell UniTable is pleasing to the eye, enjoyable to use, and built to assure long trouble-free service under most rugged in-use treatment.

LENGTH OVER ALL .....12'1"
WIDTH OVER ALL .....30"
TABLE HEIGHT .....27" or 29"
FOLDED HEIGHT .....78⅝"
8' & 10' MODELS AVAILABLE

The UniTable responds easier, faster, better, to opening and lowering. Valuable change-over time is reduced from minutes to moments.

Each section of the ruggedly constructed top rests directly on individual center legs, giving uniform table support from end to end.

Lower center of brace connections are scientifically positioned to provide increased stability and maximum rigidity — the ultimate in structural design.



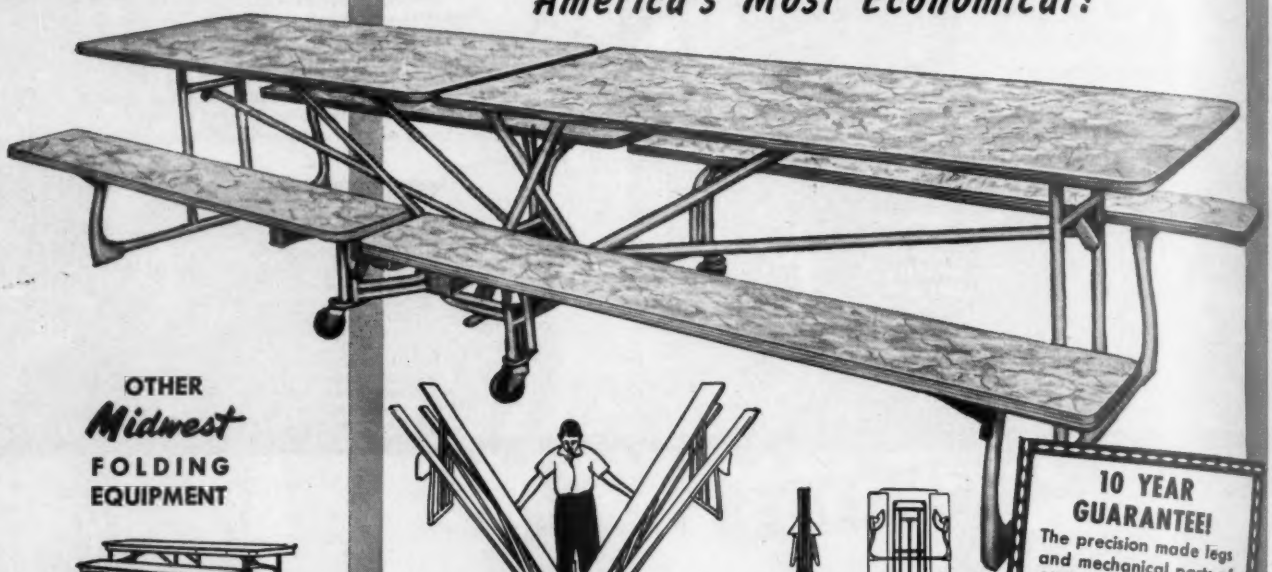
MIDWEST FOLDING PRODUCTS

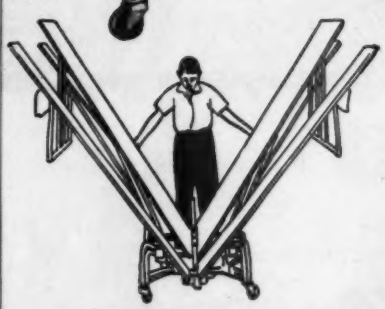
Dept. AM-306, Roselle, Illinois

Midwest

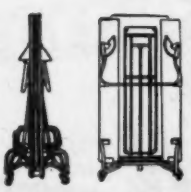
The World's Finest *Portable-Folding* TABLES

America's Most Economical!





EASY TO OPEN—EASY TO CLOSE



COMPACT STORAGE

10 YEAR GUARANTEE!

The precision made legs and mechanical parts of All MIDWEST tables and other products are guaranteed to operate satisfactorily for a period of 10 YEARS from date of purchase or they will be repaired or replaced free.

TABLE-BENCH Combination

LOOK AT THESE EXTRA FEATURES:

- ★ PUSH BUTTON FOLDING
- ★ GLIDER MOBILITY
- ★ COMPACT STORAGE
- ★ COMFORTABLY SEATS 16

Ruggedly constructed for years of service, all MIDWEST tables come with durable plastic tops and benches, tubular steel frames, heavy steel under frames and torsion bars for smooth, effortless opening and closing.

Challenger Portable Folding TABLES

Four popular sizes with all the features you'd expect to find in the most costly folding tables.

Portable Folding ROUND TABLES

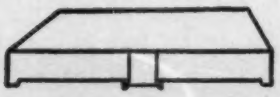
The elite of the round table line. Easy to handle—easy to fold—easy to store.

Write for FREE CATALOG *of Complete* MIDWEST FOLDING EQUIPMENT LINE!

OTHER *Midwest* FOLDING EQUIPMENT

Portable-Folding STANDING & SEATED RISERS

Portable-Folding PLATFORMS and BANDSTANDS



Portable-Folding STAGES

Adjustable HANDLING EQUIPMENT

SICO MANUFACTURING COMPANY, INC.

5215 Eden Avenue South, Minneapolis 24, Minn.

where practicality matters . . .

COST-WISE ADMINISTRATORS BUY SICO

"Lowest owning cost in the industry" explains the wise administrator's choice of SICO seating—and with good reasons. Scientific seating analyses show that SICO outperforms other seating units in requirements considered crucial by many administrators.

Seats More People In Less Space—SICO'S comfortable, scientific fixed-dimension seating requires only 6 sq. ft. per person, instead of the usual 9 to 12 sq. ft. What are construction costs per sq. ft. in your area?

Cuts Conversion-Custodial Costs—Patented torsion bar "Floating Fold" means even a child can perform conversion in 5 seconds or less! Clean and restore order, convert from cafeteria and back again in minutes. Largest SICO unit needs only 4 sq. ft. of storage space per table!

Cuts Maintenance Costs—True unitized construction of heavy 14 ga. electric arc-welded steel—not a maze of angle irons, bolts, screws, hinges and weak spot welds. Tops are tough 40 lb. center core with 60 lb. hard edge free of banding! Solid firwood benches. All metal surfaces are zinc lustron plated to end chipping and flaking.

Sanitation Is Assured—*No* banded edges to hold and hide unsanitary substances, *no* flat hinges at joints to catch food or spilled liquids, *no* unsightly tangle of pipes, braces or other debris catchers. SICO benches fold for top *and* bottom cleaning and all other components are easily accessible.

Guaranteed Versatility—Only SICO offers a *complete* seating analysis service to help you with your problems.* Only SICO has a *complete line* of table seating to assure scientific use of available space. No architectural limitations with SICO; walls can be used for windows, serving counters, other equipment. Doors, pillars and posts present no obstacle. Complete efficiency for adult use is built into every SICO product.

Lowest Owning Cost—SICO units cost less to own because they require less space to comfortably seat more. SICO costs less to own because they convert quicker and store in smaller areas, demand lower custodial expenditures and last years longer.

In all practical cost-saving features, SICO seating has proven itself second to none

**Write today for FREE seating analysis aids and for the FREE new 1961 SICO seating catalog. Request Catalog 61.*

SICO MANUFACTURING COMPANY, INC., 5215 Eden Avenue South, Minneapolis 24, Minnesota, Dept. 300.

THE JOHN VAN RANGE CO.

Branches in Principal Cities

535-555 Culvert Street, Cincinnati 2, Ohio

Cafeteria Counters • Memorial Union Building • Purdue University • Lafayette, Indiana
Architects: Walter Scholer & Associates

this food service equipment name is respected on many campuses

• This Van name plate on equipment for the preparation and serving of food is evidence of its satisfactory service on many campuses. For example, a generation after Van installed its first kitchen equipment there, Earlham College placed the contract for equipment for its latest installation.

• Illustration shows two U-shaped lanes of cafeteria service in the Memorial Union Building at Purdue where five counters serve 6000 meals daily . . . close to two million meals annually . . . in which Van's work in engineering and equipment was done in 1952 and 1960.

• When you have food service equipment problems . . . new, expansion, modernization . . . call Van early. Van engineers assist personnel of colleges and their architects in planning to co-ordinate activity and effort to meet the needs.

The John Van Range Co.

EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD

REPRESENTATIVE VAN INSTALLATIONS

Pennsylvania State University	University Park, Pennsylvania
Massachusetts Institute of Technology	Cambridge, Massachusetts
Hanover College	Hanover, Indiana
John Carroll University	Cleveland, Ohio
Michigan State College	Lansing, Michigan
West Point Military Academy	West Point, New York
Ursuline Academy	Cleveland, Ohio
University of Florida	Gainesville, Florida
Boston Public Schools	Boston, Massachusetts
Berea College	Berea, Kentucky
Holy Cross College	Worcester, Massachusetts
DePauw University	Greencastle, Indiana
University of Oklahoma	Norman, Oklahoma
St. Joseph College	Rennselaer, Indiana
North Carolina State College	Raleigh, North Carolina
Eastern Michigan College	Ypsilanti, Michigan
Sweet Briar College	Sweet Briar, Virginia
Providence College	Providence, Rhode Island
Miami University	Oxford, Ohio
High School, U.S. Atomic Energy Comm.	Oak Ridge, Tennessee
University of Texas	Austin, Texas
Marshall College	Huntington, West Virginia
Instituto de la Ciudad Universitas	Caracas, Venezuela
Wittenberg College	Springfield, Ohio
Oklahoma State University	Stillwater, Oklahoma
Ohio State University	Columbus, Ohio
University of Tennessee	Knoxville, Tennessee
Hiram College	Hiram, Ohio
University of South Carolina	Columbia, South Carolina
Central Michigan College of Education	Mt. Pleasant, Michigan
University of Kentucky	Lexington, Kentucky
University of West Virginia	Morgantown, West Virginia

B. H. HUBBERT & SON, INC.

1311 S. Ponca St., Baltimore 24, Md.

MORE MEALS PER HOUR WITH HUBBERT STEAM-JACKETED KETTLES

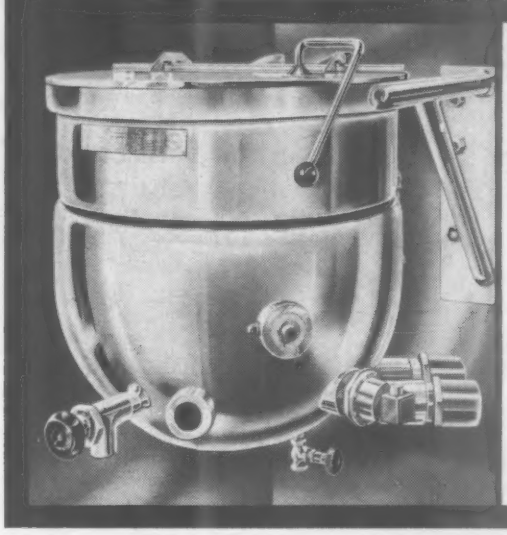
your most versatile kitchen utensil!

Self-Contained Gas-Fired Model GFK-AR2 — Fully automatic steam-jacketed kettle of stainless steel, for use where gas is the fuel.

Lowest working height. Improved insulation provides cool outer casing. Product can be cooked at any temperature between 70 and 250 F . . . suitable for cooking, simmering or keeping foods hot.

Built to conform to current A.S.M.E. code, and certification supplied.

Capacities: 10 to 80 gallons.



Wall-Mounted Electric-Fired Model TWER — Fully automatic self-contained steam-jacketed kettle.

Last word in stainless steel kettles — all set to be wall mounted at any practical height. Easily installed.

No exposed pipes under kettle — eliminates accumulation of foreign matter — saves cleaning time and labor.

Built to conform to current A.S.M.E. code, and certification supplied.

Capacities: 20 to 60 gallons.

Institutional food costs are being kept in line and reduced with versatile kitchen equipment that stays busy most of every working hour. Because they recognize this, more administrators and designers are using HUBBERT Steam-Jacketed Kettles. Everything from soup to dessert can be deliciously and economically prepared faster in HUBBERT equipment.

All HUBBERT Kettles meet the rigid safety and sanitation standards of the American Society of Mechanical Engineers and National Sanitary Foundation.

There is a style and size to fit your need. We'd like to send our catalog.

Sold through leading restaurant equipment dealers everywhere

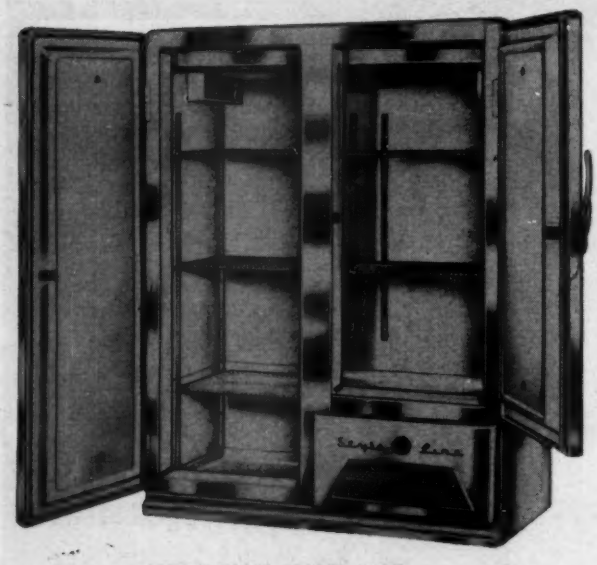
HUBBERT

1311 S. Ponca St.
Baltimore 24, Md.

SANITARY STAINLESS STEEL FOR LIFE-TIME SERVICE

JORDON COMMERCIAL REFRIGERATOR CO.

2200 Kennedy St., Philadelphia 37, Pennsylvania



TYPICAL MODEL SJ-40

REACH-IN REFRIGERATORS-FREEZERS

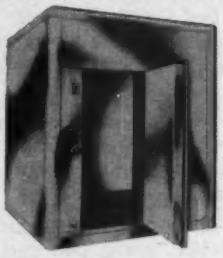
Look no further than Jordon for all your refrigeration requirements. With Jordon you choose from the largest selection of specialized food service refrigeration equipment available from one source.

A background of over 60 years in the pioneering, development and manufacturing of quality refrigeration equipment assures you of low initial costs, low maintenance, greater efficiency and convenience.

Jordon refrigerators are sold and serviced nationally by reliable dealers.

- Stainless Steel and White enamel exteriors.
- Aluminum and Stainless Steel interiors.
- Reach-in refrigerators from 11 to 90 cubic feet.
- Matching freezer models for every refrigerator model.
- Exclusive Jord-O-Matic refrigeration system.
- Condensate evaporator is standard equipment on many models (no plumbing required).
- Glass doors (hinged or sliding) available for most models.

WALK-IN COOLERS, FREEZERS and COMBINATIONS

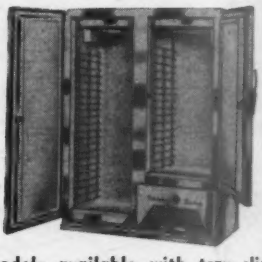


Walk-in coolers, freezers and combination cooler-freezers available in over 100 standard sizes. Polished aluminum exteriors. Available in floorless models for new construction or use with roller carts.

DUAL-TEMP REFRIGERATOR-FREEZERS

Combination refrigerator-freezers for all size requirements. Uses 2 refrigerator units for service free operation. All models have condensate evaporators—no plumbing required. Allows use of all types of portion control foods.

TRAY SLIDE MODELS



Most models available with tray slides for 18" x 26" and 14" x 18" trays. Optional convenience features include meat rails, drawers, etc.

ALUM-A-TONE MODELS

An economy priced line featuring the permanent, high luster finish—beauty of polished metal with the strength of steel. Will blend with stainless steel or aluminum fixtures—all models are priced for low budgets.
Available in complete range of sizes in refrigerator and automatic defrost freezer models for every size or type of kitchen.

BEVERAGE COOLERS

Wide variety of milk and beverage coolers. Self-service and remote models. All have top efficiency forced air cooling systems. Model CT-71 illustrated.

COMPACT UPRIGHT FREEZERS

One door economy food freezers available from 13 to 30 cubic feet capacity. All models equipped with heavy duty commercial plate type freezing system.

Write for complete literature and name of local dealers. Experienced Field Consultants and Factory Engineering Department available to Review Your Specific Requirements.

PUFFER-HUBBARD REFRIGERATOR COMPANY

Grand Haven, Michigan

Export Office • **PUFFER-HUBBARD INTERNATIONAL** • **440 Lafayette St., New York City** • **Cable "MANREFSUP"**

These Features Make
PUFFER-HUBBARD
Refrigerators
FIRST CHOICE
The World Over

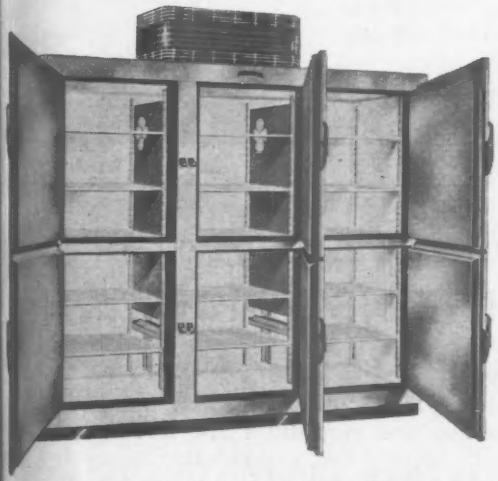
MATCHING EQUIPMENT — all models same height and depth. CONSTRUCTION — all steel shells and doors. INSULATION — 3½" in walls, 3" extra low density insulation in doors. SANITATION — 100% coved corners, ½" deep bottom spillage pan, stainless steel shelf standards which remove for easy cleaning. CONDENSING UNITS — Choice of conventional "Corner" base unit compartments or Top Mounted Unit which allows refrigerator to be set tight against wall. COOLING SYSTEM — Choice of exclusive "Dual Fan" mullion coil for heavy duty service, or ceiling coil for normal service. HARDWARE — Die cast and chrome plated. FINISHES — Lifetime porcelain and stainless steel.

Pass-Thru Model 49-4 R

Two-Compartment Models

Pass-Thru, Reach-In, and Freezer types. Capacities: 39 to 49 cubic feet. Cabinet size: 57¼" wide, 33" deep, 70½" high. Handle any of the following: One 18" x 26" tray, two 14" x 18" trays, two 12½" x 20½" pans. Interchangeable standards for tray slides — roll-out shelves or salad pan racks. 21½" net opening width for mobile carts. Choice of four finishes.

Reach-In Model 47-4 T.U.



Three-Compartment Models

"Push-In" Utility Rack Models

Available in Reach-In (Model 68-6 T.U. shown), Pass-Thru, and Freezer types. Capacities: 62 to 73 cubic feet. Cabinet size: 84½" wide, 33" deep, 70½" high. Handles one 18" x 26" tray, or two 14" x 28" trays, or two 12½" x 20½" pans. Available in four distinctive finishes.

Tray rack holds 31 18" x 26" trays, wheels in or out of refrigerator. Model UR-3 T.U. shown measures 92" wide by 35" deep by 70½" high. Other sizes available. Stainless steel exterior and interior. Available in Pass-Thru type and for Remote or Top mounted unit installation.

1-1

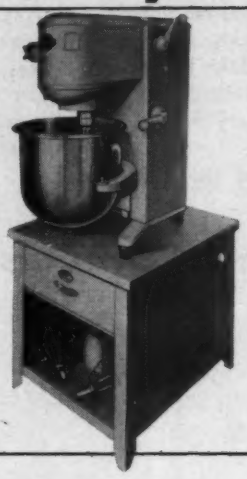
SEE YOUR P-H DEALER • WRITE FOR LITERATURE • ASK ABOUT NEW SafPHire ECONOMY LINE

THE TRIUMPH MANUFACTURING CO.

3400 Spring Grove Avenue, Cincinnati 25, Ohio

Manufacturers of quality food mixing equipment and accessories . . .

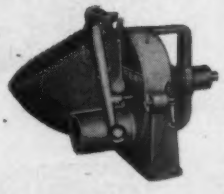
Triumph BETTER FOOD MIXERS



Brand New Bench and Floor Model
TRIUMPH MODEL N 1-20 MIXER

An ideal smaller mixer for schools, institutions, restaurants, this 20 quart mixer features *single lever control,* allowing operator to change speeds while machine is in operation. Any desired speed is available through the variable speed drive. Power take-off is conveniently located at side over mixer bench. The attachments do not project into aisles. Designed for easy cleaning the N 1-20 Mixer is sturdy, compact, quiet with antifriction bearings throughout.

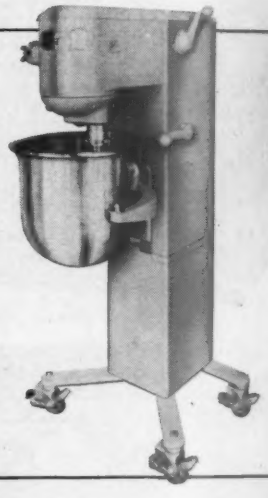
Many useful attachments available:



The Triumph Deluxe Model DL Vegetable Slicer, along with the meat grinder, tool sharpener, oil dropper, etc., is one of the many useful attachments available.

TRIUMPH N 1-20
MIXMOBILE

Incorporating all the features of the bench model N1-20 the Mixmobile has the advantage of being a fully portable floor model for complete portability and easy storage.



Kitchen Tested to give you Proven
TROUBLE-FREE SERVICE

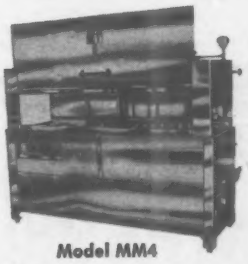
The New Triumph L 2-60 Quart Mixer

A sturdy medium sized floor mixer, the L 2-60 quart mixer meets all requirements of speed, production, and versatility. It's four speed geared transmission operates with *Single Lever Control.* Its design includes thermal overload and under voltage protection at no extra cost. There is a *new whip holder* for greater sanitation and completely rigid drive from motor to the mix. Triumph's famous Power Bowl lift is available on all larger size mixers.

UNIVERSAL DISHWASHING MACHINERY CO.

45D Windsor Place, Nutley 10, N. J.

Model HDR

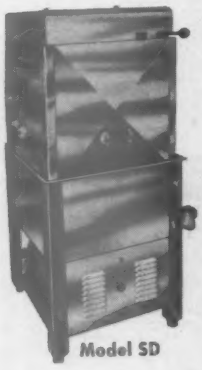


Model MM4

Universal

Dishwashing Machines

Advanced Designs with Latest Sanitation Features produce Super Sani-Clean Dishes — Glasses — Silverware



Model SD

Model B

Model 2ZB15

Model TA3

A Right-Sized type of Dishwasher for every use and purpose
Automatic and Semi-Automatic

Immersion
Roll Top
Door Type Single Tank
(16"-18"-20" Rack Size)
Glasswashers
Silverwashers
Automatic Rack Conveyor
Progressive Belt Conveyor
Circular Conveyor

Optional Equipment Available
Final Rinse Boosters
Timed Wash and Rinse Controls
Pre-Wash section—integral
Fresh or Recirculating water
Steam exhaust systems
Hi-Speed Scrapper Drawers
5 Types Progressive Conveyor Belts

FAMOUS STANDARD FEATURES

Revolving Wash & Rinse — Swing-Wash — FUL-VUE doors
Standard NEMA Motors — Vee Belt Motor Drives
Self Draining Pumps
Separate motors & pumps for power wash & power rinse

Universal
DISHWASHING MACHINERY CO.

COMMERCIAL TYPE UNIVERSAL DISHWASHERS

45D WINDSOR PLACE, NUTLEY 10, NEW JERSEY

World's Largest Exclusive Producer of Commercial Type Dish, Glass and Silver Washing Machines.

VICTORY METAL MANUFACTURING CORP.

Plymouth Meeting, Penna.

DIRECT FACTORY REPRESENTATIVES IN ALL PRINCIPAL CITIES

VICTORY V-LINE

Model Illustrated VS-48-S
two (2) section refrigerator

Available with half or full length doors in 1, 2, 3 and 4 section normal temperature refrigerators, freezers or warming cabinets in self-contained, remote & pass-through models.

SPACIOUS!

the one refrigerator really suited for volume feeding!

FLEXIBLE!

YOU can change the interior . . . in minutes . . . without tools to meet every storage need

ALL V-LINE® CABINETS MAY BE EQUIPPED WITH THE FOLLOWING:

- Pull-out or stationary shelves
- Adjustable type pan slides
- Pull-out or stationary meat rails
- Pull-out or stationary fractional pan supports
- Roller bearing drawers

50% MORE USEABLE STORAGE SPACE WHEN PULL-OUT ACCESSORIES ARE USED

LOWER OPERATING COSTS

25% more insulation maintains cold temperature longer and reduces electrical consumption

VICTORY – WORLD'S LARGEST MANUFACTURERS OF COMMERCIAL REACH-IN REFRIGERATORS

VIMCO®
STA-KOLD® • SNO-QUEEN®

ALL-METAL REFRIGERATORS WITH INTERCHANGEABLE INTERIORS

Change interiors in minutes — no tools needed. The finest refrigerator made. Excellent for portion control. Completely automatic defrost. Easy to clean. Every interior adjustable to take any or any combination of bakers pan slides, stationary or pull-out meat rails, refrigerator drawers, stationary or pull-out shelves.

OVER 200 MODELS FROM 15 TO 90 CUBIC FEET, SELF-CONTAINED REMOTE AND PASS-THROUGHS IN STAINLESS STEEL, ALUMINUM, ENAMEL, PORCELAIN

Complete new line of dough retarders, salad refrigerators, automatic defrost freezers, bakers freezers and dual temperature refrigerators.

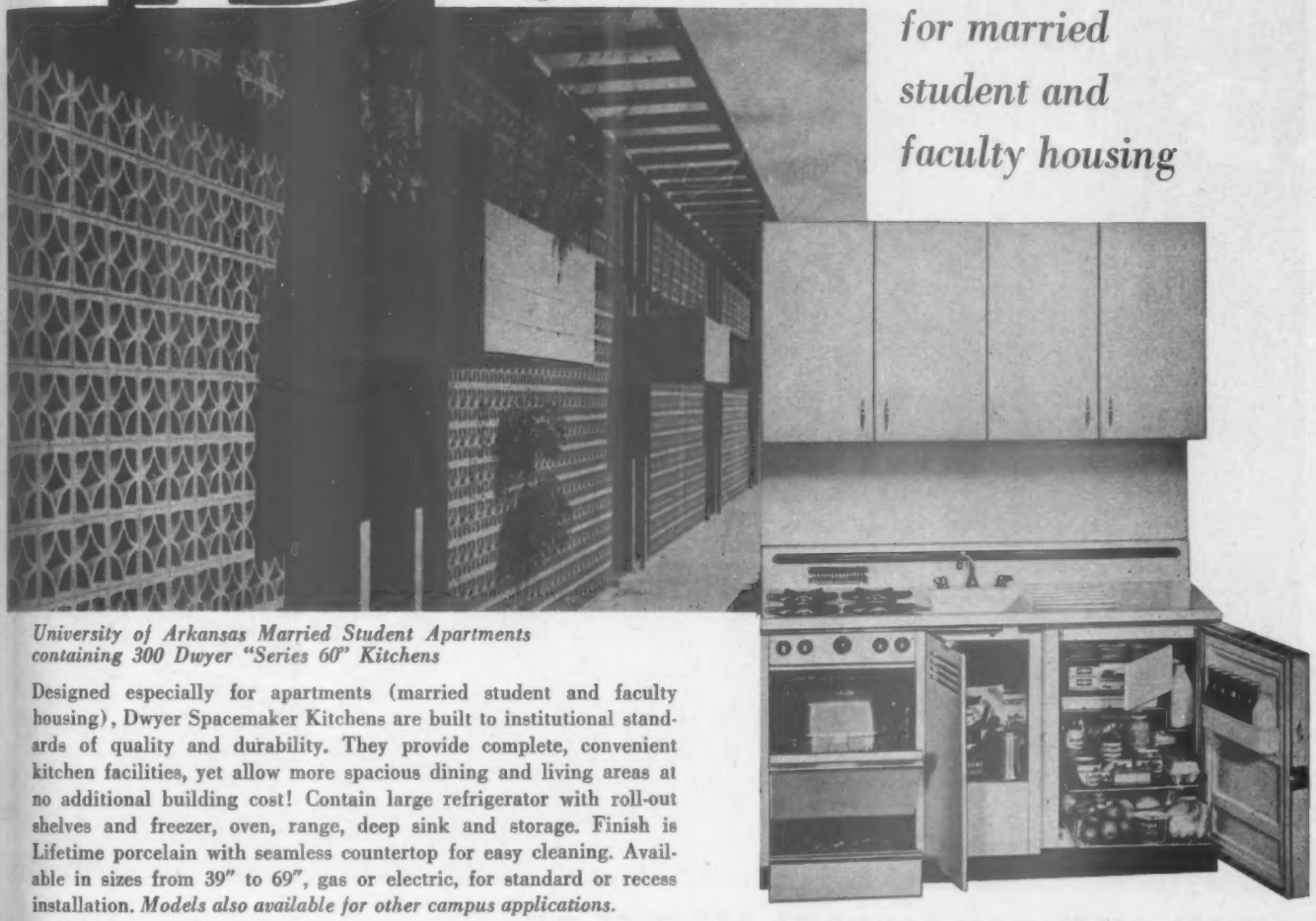
Model Illustrated RS-40-S

SEE THEM AT YOUR DEALERS TODAY OR WRITE FOR ILLUSTRATED LITERATURE

DWYER PRODUCTS CORPORATION

Michigan City, Indiana

Dwyer *spacemaker kitchens for married student and faculty housing*



University of Arkansas Married Student Apartments containing 300 Dwyer "Series 60" Kitchens

Designed especially for apartments (married student and faculty housing), Dwyer Spacemaker Kitchens are built to institutional standards of quality and durability. They provide complete, convenient kitchen facilities, yet allow more spacious dining and living areas at no additional building cost! Contain large refrigerator with roll-out shelves and freezer, oven, range, deep sink and storage. Finish is Lifetime porcelain with seamless countertop for easy cleaning. Available in sizes from 39" to 69", gas or electric, for standard or recess installation. *Models also available for other campus applications.*

University of Arkansas, University of Colorado, Indiana University, University of Kentucky, Long Island University, University of Mississippi, New Mexico State College, Northwestern University, Stanford University. COMPLETE LIST AVAILABLE ON REQUEST.

Thousands of Dwyers in use in Colleges and Universities.

SUPERIOR SLEEPRITE CORP.

CONTRACT DIVISION
759 S. Washtenaw Ave., Chicago 12, Illinois

ANNOUNCING

SKANDIA®

METAL FURNITURE
BY SUPERIOR SLEEPRITE CORP.
NEWEST FOR SCHOOLS AND COLLEGES!

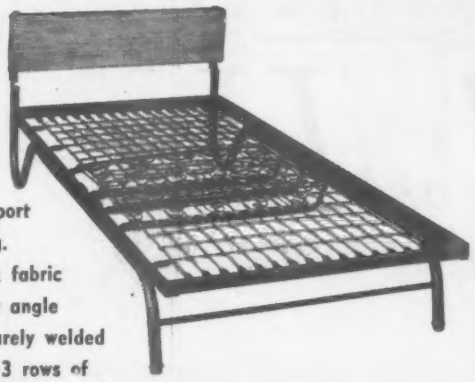
AN ALL-AMERICAN FAVORITE BECAUSE OF

- its easily arranged modular design
- its time-saving maintenance
- its surprisingly low cost
- its beautifully designed modern lines
- its distinctive touch of elegance
- its rugged, simplified steel construction

Deluxe features are evident in every SKANDIA product. All drawers are recessed, sliding quietly on nylon rollers. All are sound deadened with undercoating and are available with plastic tops. In addition to school dormitory pieces illustrated, the complete line includes equally suitable pieces for hotels, motels, hospitals and other institutions.

ITEM NO.	LEFT TO RIGHT, ABOVE:	HEIGHT	DEPTH	WIDTH
CT 450-16	Six Drawer Chest	41½"	19"	29¼"
CT 2650-6	Double Deck Bunk Bed, demounted, 3/0	—	—	—
CT 450-6	Nite Stand with one drawer	27½"	16"	16"
CT 450-1	Three Drawer Chest	30"	19"	29¼"
CT 450-7	Desk with one drawer	30"	19"	29¼"
CT 450-301	Side Chair	32"	21"	16½"
CT 450-320	Lounge Chair	36"	33"	23¼"

CT SYRACUSE BED



Legs and headboard support of 1¼" tubing. Galvanized link fabric spring in heavy angle iron frame securely welded to tubing with 3 rows of single-deck coils in center section. Black enamel finish. 1" thick birch headboard in natural wood finish. 3/0 width. Also available with No-Sag spring at slight additional cost.

SKANDIA BUNK BED

A space-saving masterpiece

36" wide, 62" high, 76½" long (inside). Sturdy 1½" square tubing with open panel ends and double hook corner locks.
CT 450-60-1 with 2 link fabric springs.
CT 450-60/6 with 2 slat band springs.
CT 180 Chest-O-Bed section (shown on bottom spring).
CT 7-Posture Coil Section (shown on top spring).
(Also available in "No-Sag" NS 9)

CT 956/9177 FOLDING COT

With standard spring, adjustable for two back-rest lounge positions. Innerspring mattress with 6-1/5 oz. ACA ticking. 6" diameter wheels for easier, silent rolling.

CT 956/9179

—With impregnated plastic mattress ticking.

THE BIG 4 SLEEP EQUIPMENT BY SUPERIOR *Sleeprite*

We know your needs and fill them — with the best quality products available anywhere at the price. Here's proof!

CT 7800 NS CARBONDALE DOUBLE DECK CONVERTIBLE BUNK BED

Round tubular end posts 1½" diameter with ⅞" stretchers. 3-piece, No-Sag springs and birchwood panels in natural finish. 3/0 width.

CONTRACT DIVISION

SUPERIOR *Sleeprite* CORPORATION

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AMERICAN SCHOOL AND UNIVERSITY—1961-62

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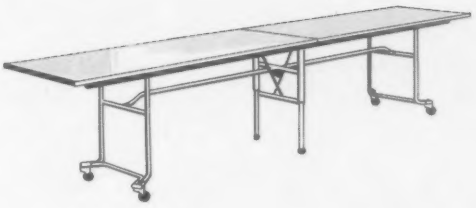


Available in 6′, 8′, 10′, and 12′ lengths, with and without benches

AIA No. 28-A-7

Solve your space problems the efficient Hamilton Erickson way

Hamilton Erickson
MOBILE TABLES

From the manufacturer of famous Erickson space savers for schools, churches, hotels, offices:

- Portable Tables
- Wall Tables
- Choral Risers
- Stages
- Tennis Tables

Hamilton Erickson

one-fold mobile tables offer more in every way . . .

- Genuine Formica plastic on top and bench surfaces.
- Available in 6', 8', 10' and 12' lengths.
- Choice of 3 widths in benchless model.
- See specifications on back page.

MODELS AND DIMENSIONS • ONE-FOLD TABLE WITH BENCHES

Model Number	Table Length	Width Of Top	Width Including Benches	Adjustable Table Height	Bench Height	Folded Height	Seating Space**
12F13	12′	30″	52″	29″ to 27″	17″	77″	16
12F14*	12′	30″	52″	29″ to 27″	17″	77″	16
10F13	10′	30″	52″	29″ to 27″	17″	65″	14
10F14*	10′	30″	52″	29″ to 27″	17″	65″	14
8F13	8′	30″	52″	29″ to 27″	17″	53″	12
8F14*	8′	30″	52″	29″ to 27″	17″	53″	12
6F13	6′	30″	52″	29″ to 27″	17″	41″	8
6F14*	6′	30″	52″	29″ to 27″	17″	41″	8

* With Furn-A-Flex Benches. ** With standard cafeteria tray.

MODELS AND DIMENSIONS • ONE-FOLD TABLE WITHOUT BENCHES

Model Number	Table Length	Table Width	Table Height	Folded Height	Seating Space*
12F3	12′	30″	29″	77″	12
12F4	12′	36″	29″	77″	14
12F5	12′	42″	29″	77″	16
10F3	10′	30″	29″	77″	10
10F4	10′	36″	29″	77″	12
10F5	10′	42″	29″	77″	14
8F3	8′	30″	29″	65″	8
8F4	8′	36″	29″	65″	10
8F5	8′	42″	29″	65″	12
6F3	6′	30″	29″	53″	6
6F4	6′	36″	29″	53″	8
6F5	6′	42″	29″	53″	10
12F6	12′	30″	27″	75″	12
12F7	12′	36″	27″	75″	14
12F8	12′	42″	27″	75″	16
10F6	10′	30″	27″	75″	10
10F7	10′	36″	27″	75″	12
10F8	10′	42″	27″	75″	14
8F6	8′	30″	27″	63″	8
8F7	8′	36″	27″	63″	10
8F8	8′	42″	27″	63″	12
6F6	6′	30″	27″	51″	6
6F7	6′	36″	27″	51″	8
6F8	6′	42″	27″	51″	10

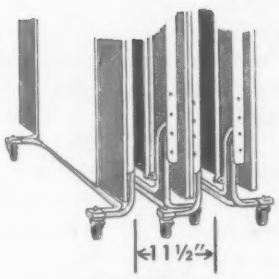
* Seating space based on 24″ segments on sides, plus use of ends.

Take advantage of Hamilton Erickson's total planning service . . .

Erickson, a pioneer in the manufacture of portable products and still the design leader in its field, proudly announces an exciting new design that makes these Hamilton Erickson one-fold tables the easiest operating, most compact mobile tables ever produced. Now, for the first time, a table with bench is available which offers an *adjustable table height!* Compare the outstanding features listed below with any other table on the market — and see why Hamilton Erickson mobile tables offer *more in every way!*

COMFORTABLE, GREATER SEATING CAPACITY

Hamilton Erickson mobile tables don't claim to seat more than others, but they *do* claim to seat as many, more comfortably! No straddling of braces, bars or struts at end or under table.

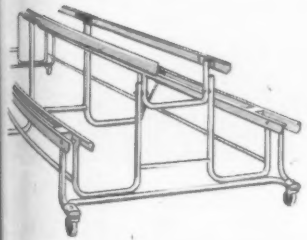


REQUIRES LESS STORAGE SPACE

An established Erickson hallmark. This is the most compact portable table on the market. When stored in series, the one-fold bench table requires only 11½" of space center to center, the one-fold benchless table only 10½".

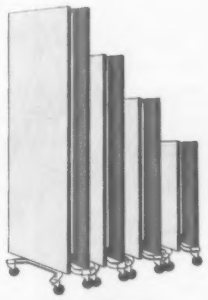
SAFE AND EASY OPERATION

Redesigned to fold easily and simply. Free of any hazard. One motion folds or unfolds table. Special torsion and compression springing maintains complete control of table during the entire folding and unfolding operation.



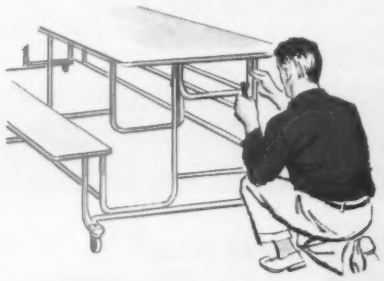
FREE STANDING UNIT FRAMEWORK

Completely unitized. Table operates without top or bench surfaces. Tops are not structural members of the table. Unitized frame provides extra strength and rigidity.



LARGER RANGE OF SIZES

Available in 6', 8', 10' and 12' lengths. This large range of sizes permits small as well as large group seating for elementary through adult levels, providing maximum utilization of all floor space.



ADJUSTABLE TABLE HEIGHT

Simple adjustment of top from 29 to 27 inches offers *correct* 10 inches in critical elbow-to-seat area for lower grade children. Bench is constant at 17 inches with top adjustable from 29 to 27 inches.

A staff of experts is prepared to offer a thorough analysis of your portable equipment requirements. In addition, factory trained Erickson specialists are available in your area to provide immediate product information and layout service. Write Hamilton Erickson for assistance — no obligation, of course.

Hamilton Erickson one-fold table specifications

One-Fold Portable Table with Benches

OPERATION

Entire unit shall open and close in a single and synchronous operation, controlled through the cycle by a combination of torsion and compression springing. End legs to be equipped with ball bearing casters to become the base for the closed unit. Table top shall be adjustable to provide less distance in critical bench to elbow area for lower grades. Unit to be secured in the closed position with past-center linkage. Positive and automatic locking in the open position.

CONSTRUCTION

Framework: Entire understructure to be completely unitized and self-supporting. Tops and benches are solely use surfaces, not to be used as structural or operating parts of the table or benches. No bars, braces or struts under the table, or from table to benches, which interfere with comfortable or capacity seating. The framework shall be designed to provide walk-in, walk-out accessibility to the benches. All top and bench surfaces to be spanned with double 16 gauge steel angles.

Tops: Table and benches to be of 3 ply with ¾" core of balanced construction, using thin, clean flakes of selected wood carefully kiln dried for proper moisture control. Bonded under controlled heat and pressure with moisture resistant thermosetting resins. Table and bench surfaces of .060 Genuine Formica Plastic bonded to wood core, and with .060 Formica Plastic balancing sheet bonded to bottom of core. All edges to be trimmed with flush type plastic moulding without exposed fastenings, lips or grooves.

FINISH

Framework: All metal parts bonderized and finished with gray baked enamel applied by electrostatic process.

Tops: Genuine Formica Plastic colors of Natural Birch or White Stylewood selection. Other Formica colors on deferred delivery. (Solid colors require price verification.)

Optional Furn-A-Flex Benches: Top surface of clear Birch veneer, vinyl finished, bonded to ¾" core of same construction as the standard core. Edges finished with a natural sealer. Surface material is unaffected by climatic or aging conditions and is resistant to acids, alkalis, food and vegetable oils, crayons, lipstick, ink, household oils, greases, etc.

One-Fold Portable Table without Benches

OPERATION

Entire unit shall open and close in a single and synchronous operation, controlled through the cycle by compression springing. End legs to be equipped with ball bearing caster to become the base for the closed unit. Table to be secured in the open and closed position with positive and automatic locking.

CONSTRUCTION

Framework: Entire understructure to be completely unitized and self-supporting. Tops are solely use surfaces, not to be used as structural or operating parts of the table. No bars, braces or struts under the table which interfere with comfortable or capacity seating. Tops to be spanned with double 16 gauge steel angles.

Tops: Table to be of 3 ply with ¾" core of balanced construction, using thin, clean flakes of selected wood carefully kiln dried for proper moisture control. Bonded under controlled heat and pressure with moisture resistant thermosetting resins. Table surface of .060 Genuine Formica Plastic bonded to wood core, and with .060 Formica Plastic balancing sheet bonded to bottom of core. All edges to be trimmed with flush type plastic moulding without exposed fastenings, lips or grooves.

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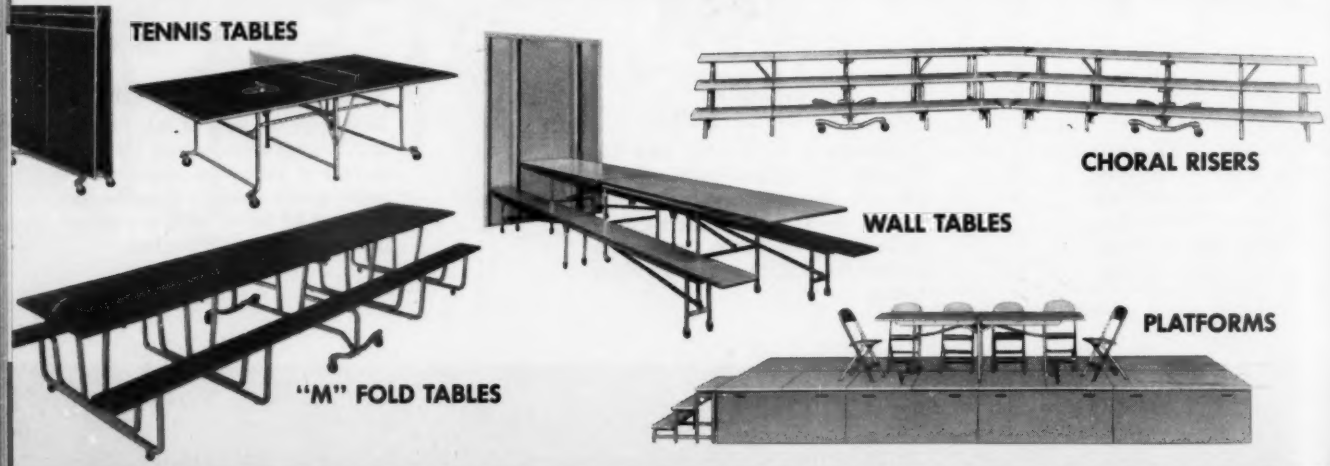
Tops: Genuine Formica Plastic colors of Natural Birch or White Stylewood selection. Other Formica colors on deferred delivery. (Solid Colors require price verification.)

Other Hamilton Erickson portable space savers



Hamilton Erickson portable products

HAMILTON MANUFACTURING COMPANY • TWO RIVERS, WISCONSIN

LITHO IN U.S.A.

Note: The manufacturer reserves the right to make material and design changes to further improve the product.

All Erickson Portable Products are manufactured under one or more of the following patents: 2,514,319, 2,723,89[illegible] 2,764,460, 2,820,242 — Additional Patents Applied For.

Form FL-264 - Rev. 1 File A.I.A. 35C

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TENSILE ALUMINUM FOOD SERVICE EQUIPMENT

the complete line

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INFRA-RED
FOOD WARMERS

For every food service in . . .

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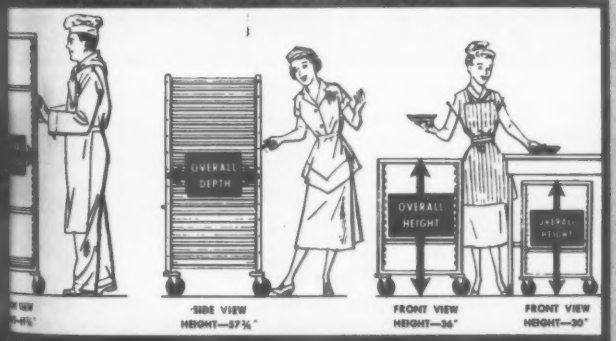
STANDARD UNIT FOR EVERY HEIGHT REQUIREMENT



Sizes of Crescent Equipment Compared with:

Average Man 5 10 An Average Woman 5 5 A Worktable 38

very food service function

DELIVERY, STORAGE, PREPARATION

CESSING, SERVING, HOLDING, BUSSING

by a company with 24 years' experience, Cres-nits are used throughout the world by leaders in od service industry.

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A Food handling unit for every standard size
PANS — TRAYS — SCREENS — BASKETS

23 x 33 Donut screen	16 x 16 Dish racks
23 x 23 Donut screen	15 x 21 Canadian pans
20 x 22 Roasting pans	15 x 20 Trays
20 x 20 Glass racks	14 x 18 Trays
19 x 19 Donut Screen	12 x 20 Steamtable pans
18 x 26 Bun Pans	12 x 16 Mess trays
18 x 26 Trays	11 x 14 Mess trays
18 x 26 Baskets wire	10 x 20 Roasting pans
18 x 24 Bakers Sheets	10 x 14 Compartment trays
16 x 22 Trays	9 x 18 Display pans

PIE TINS—MEAT PLATTERS—TOTE BOXES

Units for other sized pans or trays are made as specials Information furnished on request.

Pan, tray, screen etc., sizes are approximate only. When ordering CRES-COR Units specify actual dimensions, make and model number of pan, tray, screen etc., to be carried.

OFFERED IN 6
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To Carry from 1 to 250 Pans or Trays

1. CORRUGATED SIDE WALLS

2. ANGLE LEDGE SIDE WALLS

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4. CHANNEL PAN SLIDES

5. GLIDE-OUT & SLIDE-OUT SHELVES

6. HORIZONTAL SHELVES

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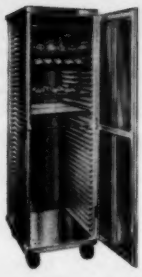
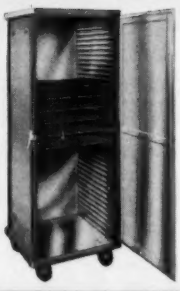
CABINETS • RACKS • HAND LIFTS • CART

UTILITY CABINETS—4 Heights
100-1841-70 in.
100-1833-58 in.
100-1822-42 in.
100-1818-36 in.



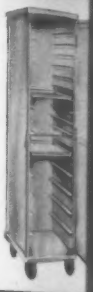
COLD CABINET
Model 102-1841 ←

MERCHANDISER CABINET
Model 111-1814 →



DONUT CABINET
Model 100-2341 ←

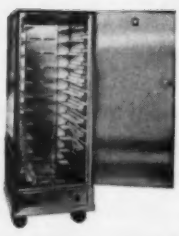
ANGLE CABINET
Model → 101-1817



CABINETS • HOT • INSULATED • REFRIGERATED • UTILIT

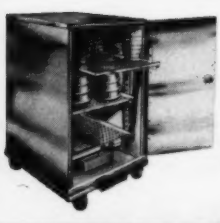
UNIVERSAL CABINETS Interchangeable Interiors

UA—Universal Angles
UG—Glide-Out Shelves
US—Slide-Out Shelves
UPC—Angles with Plate Carriers



Universal HOT CABINET
Insulated Model
H-137-UA12 ←

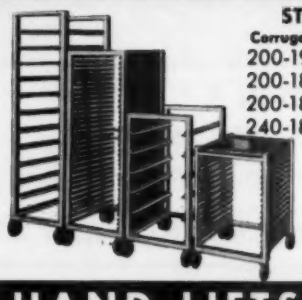
Universal HOT CABINET
Not Insulated
Model 131-UA9 →



Universal HOT CABINET
Insulated Model
H-133-UG3 ←

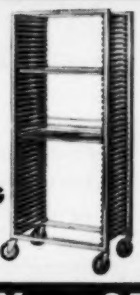
Universal REFRIGERATED CABINET
Insulated Model
R-171-UA9 →

RACKS • STANDARD and WIDE OPENING TRAY TOP • TANDE

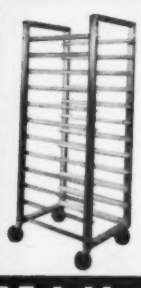


STANDARD RACKS

Corrugated	4 Heights	Angles
200-1941	70 in.	201-1812
200-1833	58 in.	201-1810
200-1822	42 in.	201-186
240-1815	36 in.	241-186

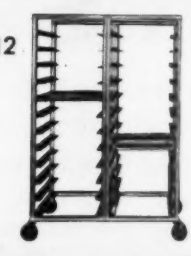


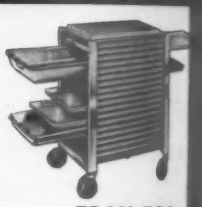
WIDE OPENING RACK
Model 210-1841



207 SERIES
Model 207-1812 ←

TANDEM RACK
Model 2211-1548 →



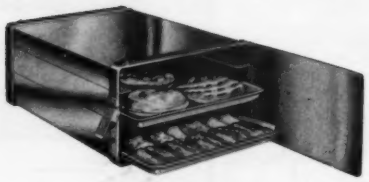


TRAY TOP RACK
Model 240-1

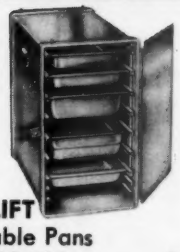
HAND LIFTS • UTILITY • STEAM TABLE PANS • PIE TINS

HAND LIFT
Utility Model 321-1810

HAND LIFT
Utility Model 300-1811



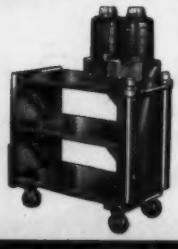
HAND LIFT
Utility Model 301-183



HAND LIFT
Steam Table Pans
Model 302-128

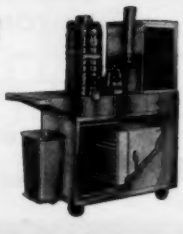
HAND LIFT
Pie Tin Model 350-1

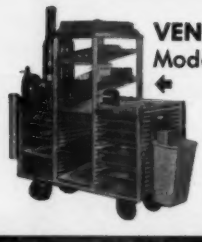
CARTS • COFFEE BREAK • INDUSTRIAL • VENDORS • SPECIA



COFFEE BREAK
Model 711 ←

INDUSTRIAL SERVICE
Model 708 →





VENDOR'S CART
Model 716 ←

SPECIAL CART
Made to Customer Requirements
Model 710 →

BUY the BEST • BUY CRES-COR "Designed Stronger to Last Longer"

CRESCENT metal products, inc.

Main Offices: 18901 St. Clair Ave., Cleveland 10, Ohio
Factories at: Willoughby and Wickliffe, Ohio

For Further Information Get Complete CRES-COR Catalog 459

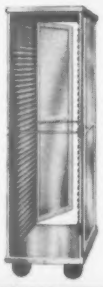
COMPLETE LINE OF INFRA-RED FOOD WARMER

HERE'S A CRES-COR ALUMINUM MOBILE UNIT FOR EVERY FOOD SERVICE OPERATION

RECEIVING ••• ▶ STORAGE ••• ▶ PREPARATION ••• ▶ PROCESSING •••• ▶ HOLDING •••• ▶ SERVICE ••• ▶ DELIVERY

DOUBLE DOOR CABINET
Model 106D-1841

PASS-THRU CABINET
Model 104P-1841



FOOD SERVICE CABINET
Model 146-UPC72

SPECIAL CABINETS

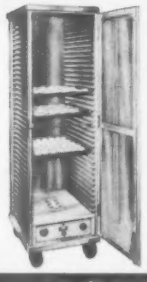
Model 2059-2

Model 3101

SERVICE • PROOF • "Hot Stuff" HAND LIFTS

Utility HOT CABINET
Not Insulated
Model 130-1836

PROOF CABINET
Model 120-1836



HAND LIFT
Propane Heated
Model H-331G

HAND LIFT
Propane Heated
Model H-341G

HAND LIFT
Electric Heated Model H-331E

BUTTERFLY • HORIZONTAL SHELF • UNIVERSAL ANGLE

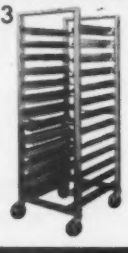
BUTTERFLY RACK
Model 2209

HORIZONTAL RACK
Model 270-40 Series

VERTICAL RACK
Model V-256 Series

TRAY RACK
Model 271 Series

UNIVERSAL ANGLE RACK
Model 207-UA13

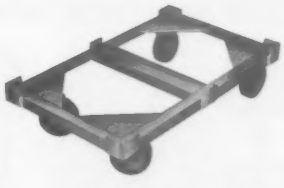


HANDY DOLLIES • UTILITY • GLASS RACKS • BASKETS

UTILITY DOLLY
Model 510-6-1118

GLASS RACK DOLLY
Model 500-2020

GLASS RACK DOLLY
Model 241-204



SPECIAL DOLLY
Model 530-3220

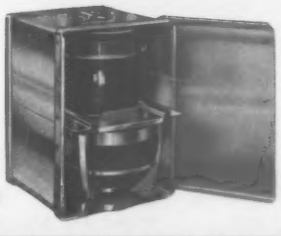
CRES-COR BASKET
Model 805-18

CATERERS' EQUIPMENT • CARRIERS • BOXES • TRAYS

CRES-COR manufactures Special and Custom Units to meet customer requirements. Refer to Section Y in Cres-Cor Catalog 459 for necessary information to be furnished.

CHAFING DISH CARRIER
Model 376-1

BEAN POT CARRIER
Model 375-1



CATERING CARRIER
Model 820

A COMPLETE LINE FOR ALL APPLICATIONS

For further information get Catalog 459

CRESCENT metal products, inc.

Main Offices: 18901 St. Clair Ave., Cleveland 10, Ohio
Factories at: Willoughby and Wickliffe, Ohio

CRES-COR INFRA-RED FOOD WARMERS

A COMPLETE LINE OF MODELS FOR EVERY APPLICATION

3 TYPES OF INFRA-RED ELEMENTS
"Golden Glow" Lamps – Metal Tubes – Quartz Glass Tubes

3 SATIN FINISH HOOD COLORS
Aluminum – Brass Copper

3 RECTANGULAR HOOD STYLES
Shallow – Narrow Deep

3 DECORATOR HOOD STYLES
Styles 1, 2 and 5 in 3 Hood Designs Standard – Deluxe – Starlite

Most Series UL Listed, U in Model Number indicates UL listing. All shipped complete with Infra-Red Elements and Switch to operate on 110-120 Volt 60 cycle AC. Plug-in Models furnished with an 8-foot Cord Set with 2-prong plug. Other models furnished with 4-inch octagon outlet box, with ½ inch KO's and sufficient wire to make connections.

CRES-COR SERIES 8—DEEP HOOD MODELS with "Golden Glow" Infra-Red Lamps

MODEL IFW-368-U-3
OA—8" D x 11" W, Lengths 24, 36, 48 and 58 ins. with 2, 3, 4 or 5 lamps depending on length.

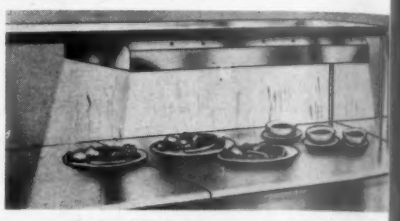
Deep Hood Units illuminate as well as heat. Add eye and sales appeal while keeping foods hot and ready for service.

Series 8 Models may be Shelf or Leg Mounted or Hung by Chains

CRES-COR SERIES 25—SHALLOW HOOD MODELS with Metal Tube Infra-Red Elements

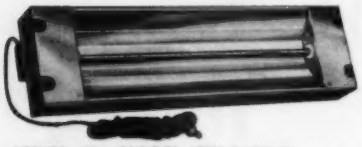
MODEL IFW-3625-U
OA—3" D x 11" W, Lengths 24, 36, 48 and 58 ins.

Shallow hood warmers are ideal for mounting under shelves, canopies or places with limited overall clearance.



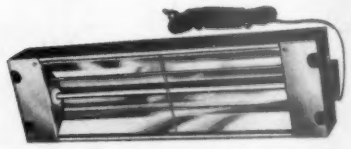
Series 25 Models may be Shelf or Leg Mounted or Hung by Chains

CRES-COR NARROW HOOD MODELS



SERIES 27—MODEL IFW-2427-U
OA—2 5/16" D x 6¼" W, Lengths 24, 36, 48 and 58 ins.

Narrow Hood Models have a new design multi-face polished reflector which directs heat pattern over only the desired area. Quartz glass elements illuminate as well as heat. Narrow hoods can be counter mounted on legs, shelf mounted or hung by chains.



SERIES 28—MODEL IFW-2428-U
OA—2 5/16" D x 6¼" W, Lengths 24, 36, 48 and 58 ins. Furnished with plated-wire guard.

CRES-COR DECORATOR HOOD MODELS with "Golden Glow" Infra-Red Lamps.

FLEX-O-RAY
Model IFW-60

SWIVEL SPOT
Model IFW-68-U
Also available as Stationary Spot
Model IFW-69S-U

RIGID STEM
Models
Lengths 24 to 60 ins.
for Ceilings 6 to 9½ ft.

PULL-DOWN
Models
Lengths 27 to 103 ins.
for Ceilings 6 to 12 ft.

HEAT-N-SERVE
Model IFW-61

Style 1 Standard

Style 1 Deluxe

Style 1 Starlite

RIGID STEM SERIES
Model IFW-62-U-S and Model IFW-64-U-S

PULL-DOWN SERIES
Model IFW-63, 65, 67-U-PD

Style 2 Standard

Style 2 Deluxe

Style 2 Starlite

HOOD STYL FOR RIG

PULL-DOW SER

CRESCENT metal products, inc.

Main Offices: 18901 St. Clair Ave., Cleveland 10, Ohio
Factories at: Willoughby and Wickliffe, Ohio

FOR MORE INFORMATION ON THE COMPLETE CRES-COR LINE SEE YOUR CRES-COR DEALER

J-3/Ro

Royal Fiber-X dormitory furniture shown.

In dormitories, classrooms, cafeterias...

Royal® FURNITURE TAKES ABUSE

...stays beautiful through years of use!

FIBER-X . . . so indestructible we give it a ten-year guarantee
Enduring surface beauty won't chip, peel, scratch, check, warp, dent, or crack. Inner strength comes from welded square steel tubing, makes long-range economy real. Choose the beauty you like in Birch, Butternut, Walnut and Cherrywood finishes. All components are interchangeable or individually replaceable thanks to Royal's unique modular construction.

VENTURA . . . features removable and replaceable metal panels
Truly "custom-made" furniture at production-line prices! Outstanding style and strength in a complete line of dressers, chests, bedside cabinets and beds. Select an economical metal finish, or a Plastelle-enameled finish on metal panels available in 16 decorator colors.

WOODRIDGE . . . the beauty of wood, strength of steel
Furniture that imparts a friendly, homelike atmosphere conducive to study and relaxation. Combines the warmth of wood with sturdy steel frames for unmatched appearance and durability. Individual pieces and combinations for every need . . . chests, dressers, night tables, luggage racks, desks, beds. Wood Panel Finishes: American Walnut or Finnish Birch.

LOW-COST FAIRFIELD
Outstanding all-metal unit-built dorm furniture priced to stretch appropriations. Dressers, vanities, chests, beds—everything . . . designed with classic simplicity, constructed for years of hard usage without showing wear. Solid or two-tone oven-baked Plastelle enamel finish. Tops: Plastelle-enameled metal, or Royaloid.

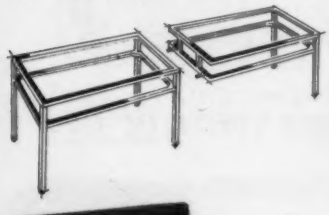
Royal®

designed with your purse in mind

Here's a sparkling example: a student lounge that boasts real comfort for your visitors plus economy, beauty and a rainbow of colors for you. Only Viscount has the quality that's guaranteed for 10 years!

VISCOUNT LEADS THE FIELD FOR VERSATILITY

New modular idea solves many problems at once. Simply add on the units you need. Two heavy-duty thumb screws provide strong, rigid "one-piece" assembly. Each piece you add has only 2 legs—becomes visually and truly one when they are joined. Viscount lets you tailor your furniture "buy" to any room shape or size . . . rearrange to meet changing tastes or needs . . . allow for growth.



Solve your problem in any seating area with these four beautiful units!

CHAIR, No. 700. Back and seat are made as one piece, at proper tilt for maximum comfort, and constructed as a unit. Welded steel internal frame construction and Royal quality throughout assure many years of service.

INDIVIDUAL OTTOMAN, No. 702. Top is made with ventilated metal seat pan and 3"-thick molded foam rubber cushioning. Upholstery: Super-Tuftex, Naugahyde, Trilok, or Royalpoint in complete color selection to match chairs. Top dimensions: 24" x 19¾". Top to floor: 17".

INDIVIDUAL TABLE, No. 704. Genuine Royaloid — cigarette-burn-proof, alcohol-resistant. Only "damp cloth" maintenance is needed. 7-ply balanced plywood base with plastic reinforcing bottom sheet and durable top surface in plain, wood-grain, or linen finish. 20 colors. Dimensions: 24" wide x 19¾" deep. Top height from floor: 14½".

PLANTER TOP UNIT, No. 706. Same height, colors and construction as table top units. Features 16¼", 12½" x 6" deep "planter" located in center. Wide range of corner and accessory tables also available.

Royal® CAFETERIA FURNITURE

For bright, good-looking cafeterias that stay attractive with easy maintenance, *Royal* has developed a complete line of furniture designed to withstand everyday usage. The broad selection of metal finishes, table tops, and upholsteries complements any decor. *Royal* seating and tables bring you beauty, efficiency, and the economy of dependable service. Tables should be selected and specified according to type base and top desired.

TABLE TOPS

Long-wearing *Royaloid*. Resists heat, stains, scratching, and chipping. Easily cleaned with a damp cloth. Pastel, linen, or authentic woodgrain surface and colors of your selection. Aluminum or matching *Royaloid* edging. Sizes:

Circular	24″, 30″, 36″, and 48″ diameter
Square	24″, 30″, 36″, and 48″.
Rectangular	24″ x 42″, 24″ x 48″, 30″ x 48″, 30″ x 60″, 30″ x 72″, 36″ x 60″, and 36″ x 72″. 72″ lengths have Royaloid edging only.

LABORATORY STOOLS

NO. 501. Stationary stool for laboratories and other uses. Heavy-gauge steel seat with tempered Masonite panel. All-welded steel frame and channel footrest. No. 501-S, height 18″. No. 501-M, height 24″. No. 501-T, height 30″.

NO. 621. Swivel stool. 14″ diameter, heavy gauge steel seat, with tempered Masonite panel. Cluster leg design for rigidity and complete freedom of movement. Exclusive Micro-Hite adjustment, in three seat height ranges: 621-S, adjustable 17″ to 23″; 621-M, 22″ to 28″; 621-T, 27″ to 33″.

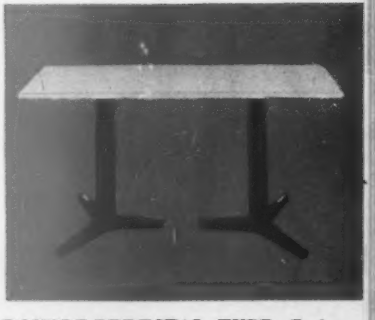
NO. 668. Swivel chair. Comfortable extra-thick foam rubber seat, 17″ x 16″. Adjustable, padded back rest. Metal seat pan. Cushioned floor glides. Exclusive Micro-Hite seat adjustment. 668-M, adjustable 21″ to 27″; 668-T, 26″ to 32″. With casters, 668-MC and 668-TC (casters add 2″ to height).

TABLE BASES *(Standard Height with Top, 29″)*

CORNER-LEG TYPE. Popular and versatile. Round tubular steel legs in bright chrome, No. 201-B. Square tubular steel legs in Satin-Chrome, No. 801-B. Square tubular steel legs, Plastelle enameled, No. 901-B. For top sizes to 60″.

SINGLE-PEDESTAL "MUSHROOM." 4″ diam. steel column. 22″ diameter base with no-tip flange. With Satin-Chrome column and base, No. 757-B. With scuff-proof black crinkled finish, No. 966-B. For tops to 36″.

SINGLE-PEDESTAL, 4-LEGGED. Formed steel with adjustable floor glides. With scuff-resistant black crinkle finish and black plastic kick-plates, No. 967-B. Also supplied with metal kick-plates and base in Satin-Chrome. For tops to 36″.



DOUBLE-PEDESTAL TYPE. Each formed-steel pedestal has three legs with adjustable glides. With black plastic kick-plates and black crinkled finish, No. 968-B. Also supplied in Satin-Chrome. For tops 24″ x 42″, and larger.

TYPICAL CAFETERIA CHAIRS

NO. 740. Comfortable, attractive stacking chair. Flex-spring seat, steel back pan, wall-saver legs. All-welded steel frame. Satin-Chrome. Full choice of durable Royal upholsteries.

NO. 924. Saddle-shaped wood seat of natural-finish hard maple or birch. All-welded steel frame and slat back. Wall-saver rear legs. Finished in colorful, durable Plastelle enamel.

NO. 937. Low-cost, all-metal chair. Contoured seat, panel back, all-welded steel frame. Available in a variety of two-tone Plastelle color combinations or in standard Fawn.

NO. 836. Soft, graceful lines. Saddle-shaped, padded and upholstered seat and back. All-welded steel frame, Satin-Chrome finished. No. 936 with baked-on Plastelle enamel.

NO. 1630. Padded and upholstered seat and back. Metal seat pan. Flared rear legs prevent back from rubbing wall. All-welded steel frame, Satin-Chrome finished.

FURNISH WITH Royal® FOR EFFICIENCY

A comfortable student works better, learns faster and is easier to teach!

DELUXE LIBRARY SHELVING WITH STRENGTH AND BEAUTY TO SPARE!

The bright, beautifully styled line of DeLuxe library products combines functional design with sturdy construction to provide the finest library shelving and accessories. All DeLuxe products are quality made of heavy gauge steel. No rough, unfinished raw edges. DeLuxe provides for quick assembly, ease of adjustment and strong construction. Every shelf ties into the upright members for greater sectional stability. Accessories include: magazine shelf, book support, card holder, newspaper rack, label holder and range finder.

Library Desk

SCHOOL DESKS AND CHAIRS TAILORED TO STUDENT REQUIREMENTS!

A TYPING DESK . . . designed for latest training techniques

For any manual or electric typewriter. Model 1700 (shown) has V-braced frame for extra rigidity against vibration of electric machines. Hand-crank raises and lowers typewriter for perfect posture. Open-front storage cabinet, handy pullout shelf. Also available for left-handed students or for use as business machine desk. Special glides prevent creeping. Finished in colorful oven-baked Plastelle Enamel. Modesty panel optional on all units.

DIMENSIONS: Overall 35½" long x 19" wide x 30" high; machine platform height adjustable 26" to 30"; machine platform and work top, each 18" long x 15½".

MODEL 1700—Clear Lacquered Birch Top.

MODEL 1702—Same as 1700 but with 9½" sq. detachable bookshelf on leg.

MODEL 1704—Fiberesin Top.

MODEL 1706—Same as 1704 but with 9½" sq. detachable bookshelf on leg.

B EFFICIENT POSTURE CHAIR

Model 1750—Contoured seat and back, scientifically pitched for correct posture. Back rest has adjustable tile, 4-way adjustment for proper back support. Clear birch seat, black. Plastelle enameled square-tubular steel legs, rubber glides.

DIMENSIONS: Seat 16½" wide x 15¼"; height 17½"; back 13" x 7". Colors: Salmon Rose, Wedgewood Blue, Sandalwood, Turquoise, Grey.

Student Desk #1740 — Student Chair #1752 — Art Desk #1736

CABINETS AND WARDROBES TO SOLVE ANY STORAGE PROBLEM!

No. 1072. Double Wardrobe. A full-width wardrobe with full-opening, easy-access double doors and large space for many garments. Made with full-width hat shelf and steel coat-hanger bar. Colors: Office Green; Office Gray.

Overall ..... 36" wide x 78" high x 18"

No. 1073. Same as above, but 24" deep.

No. 1070. Storage Cabinet. Rugged, exceptionally strong and stable for the storage of supplies, records, even heavy office machines. Double doors with high-quality lock. Four sturdy, adjustable steel shelves. Colors: Office Green; Office Gray.

Overall ..... 36" wide x 78" high x 18"

No. 1071. Same as above, but 24" deep.

No. 1074. Wardrobe Storage. A double-duty cabinet that stores coats at left, hats across top, rubbers and galoshes on separate bottom shelf, and provides additional shelving for personal effects, records, supplies. Door has lock; two keys. Colors: Office Green; Office Gray.

Overall ..... 36" wide x 78" high x 18"

No. 1075. Same as above, but 24" deep.

BUILDING? REMODELING? REFURNISHING?

Write for free literature and name of nearby dealer. Let him help you with initial planning. He can save you time, trouble and money.

ROYAL METAL MANUFACTURING COMPANY

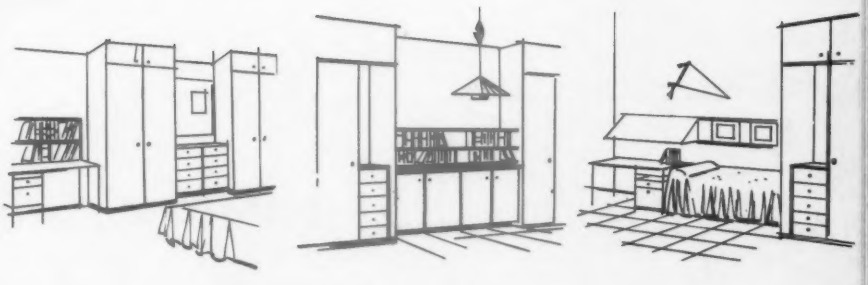
SCHOOL DIVISION, ONE PARK AVENUE, NEW YORK 16, NEW YORK

Showrooms: New York; Chicago; Los Angeles; San Francisco; Seattle; Galt, Ontario.

Dealers from Coast to Coast

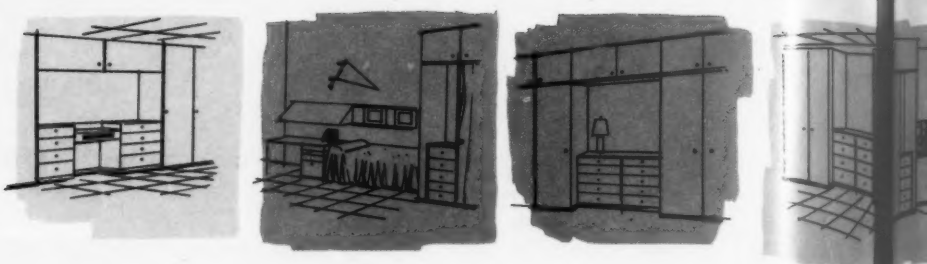
Versatility Unlimited

DORM LINE FURNITURE by SIMMONS



New ideas in dormitory furnishings start with Dorm Line's exceptional versatility. Unlimited combinations make it possible to achieve rooms attractively equipped to serve and survive student living. For more information turn the page...

Unlimited room arrangements with **DORM LINE** *plans like these...*

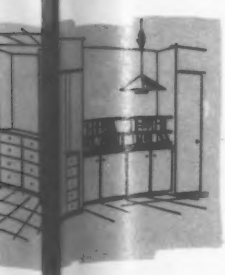
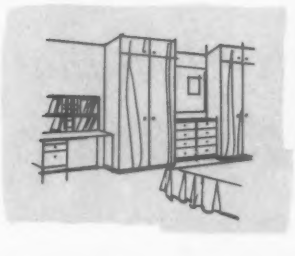
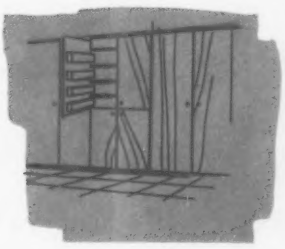


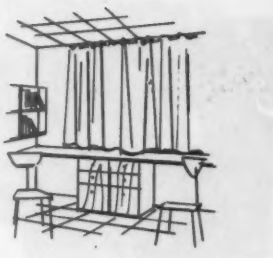
Planning...installation...maintenance...financing —all EASIER with Simmons Dorm Line

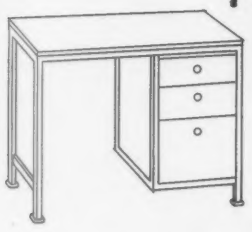
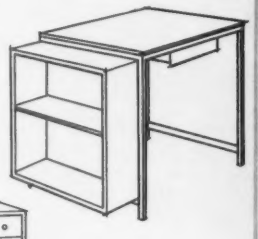
From start to finish, your job is simplified with Dorm Line installations—simplified even in building design. Rooms may be planned in standard shapes and sizes to save time and costs. They may be arranged in a wide variety of ways without loss of spaciousness. Then as you add Dorm Line units, you achieve efficient, colorful, homelike rooms.

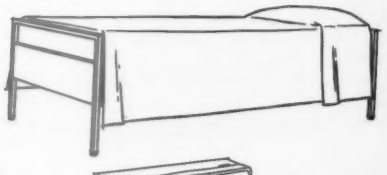
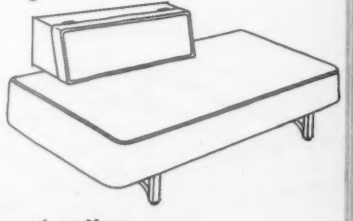
Installation is quick and easy—no time-consuming custom-built wardrobe or closet construction required. Easy maintenance—certainly. Steel construction means "student-proof" abuse-resistance and durability...wardrobe frames never warp...doors won't sag or stick...steel drawers assure smooth, quiet operation.

Money problems are easily solved. Simmons Dorm Line wardrobes, chests, desks—even beds—are built-in to qualify for *long-term* government financing. This all adds up to furniture that long outlasts the loan!



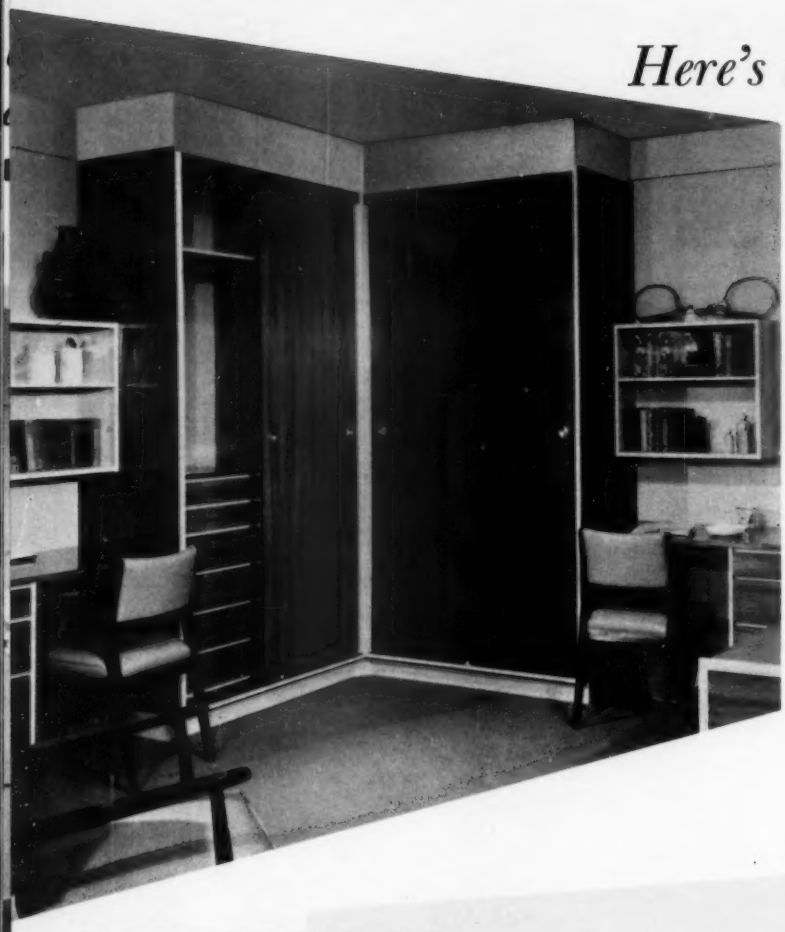
Students like to live with Dorm Line's color, comfort, convenience

There's pleasant, homelike living designed into Simmons Dorm Line. Decorating ideas are unlimited because Simmons offers the widest variety of colors, finishes and fabrics ever made available in dormitory furnishings.

Starting with wardrobes—they may be finished with birch face or natural Novoply, sealed and lacquered...or painted in a choice of solid colors or two-tone combinations. Free-standing units feature a variety of colors—in finishes and fabrics. Chests are finished in color with tops of wood-grained Fiberesin.

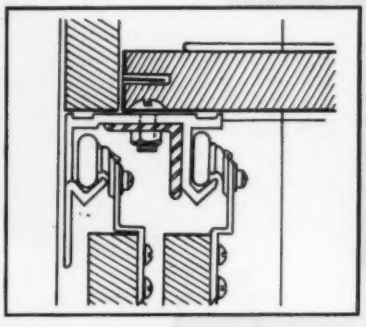
Dorm Line offers many comfort features. There is correct-posture comfort in Simmons chairs...sleeping comfort on Beautyrest® mattresses. Complete Dorm Line rooms—with wardrobes, furnishings and accessories—make dormitory life convenient and efficient.

Free-standing DORM LINE units...
In addition to wardrobes, Dorm Line includes desks, bookshelves, chairs, chests and beds. To qualify for long-term government financing, chests, desks—even beds—may be built in.

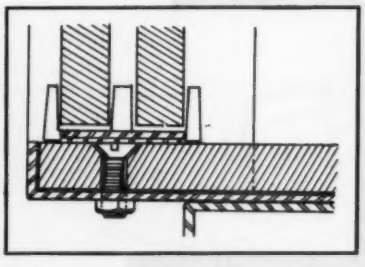


Here's the construction that safeguards your investment in Dorm line

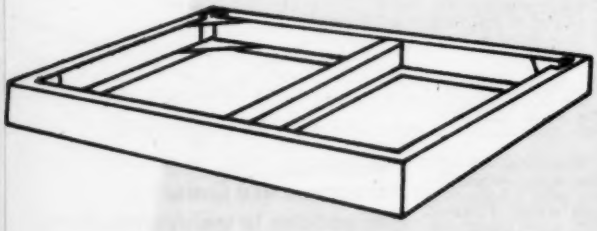
Compare Dorm Line furniture with any other and you readily see important differences in ruggedness and durability. Dorm Line's prefabricated, steel-framed wardrobes, shipped K.D., are installed on the job at a fraction of the cost and time required for wood units. Every construction detail contributing to long life is built into Dorm Line. Efficiently designed units offer unexcelled opportunity for effective, economical use of floor space. Standards of quality control are rigid. This furniture will keep its new look through generations of students to make your investment in Dorm Line a wise and lasting one.



② Smooth-sliding doors pass the 1500-lb. strength test because track assembly is secured to the steel framework and hanger brackets are screwed into the back of doors rather than to the top edging.



③ Triple guides at bottom of doors are securely anchored to wardrobe floor. Doors can glide smoothly because there is no single center lip to break or split if weight is thrown against the door.



④ Bonderized steel base bolts to frame, is reinforced with gussets at each corner.

① Wardrobes feature all-steel framework to which you may add side panels, back panels and doors in a variety of materials and finishes. Front frame wrap-around protects panel edges. Method of attaching panels to welded steel frames eliminates possible warping or tension.

⑤ Dorm Line wardrobes are quickly and easily installed. A series of components allow wardrobes to be designed for any area. They may be completely free-standing or built in by utilizing existing walls. Average installation time is less than 20 minutes.

SIMMONS COMPANY
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Kranzten Studio Inc.

Equipment Requirements for Business Education

by M. Claire O'Brien

Consultant in Business Education, California State Department of Education, Sacramento

Miss O'Brien has B.S. and M.A. degrees from University of California, Berkeley, and has done graduate work there also. She has been a high school business education teacher, vice-principal and principal. Miss O'Brien has been serving California as a consultant in business education since 1957.

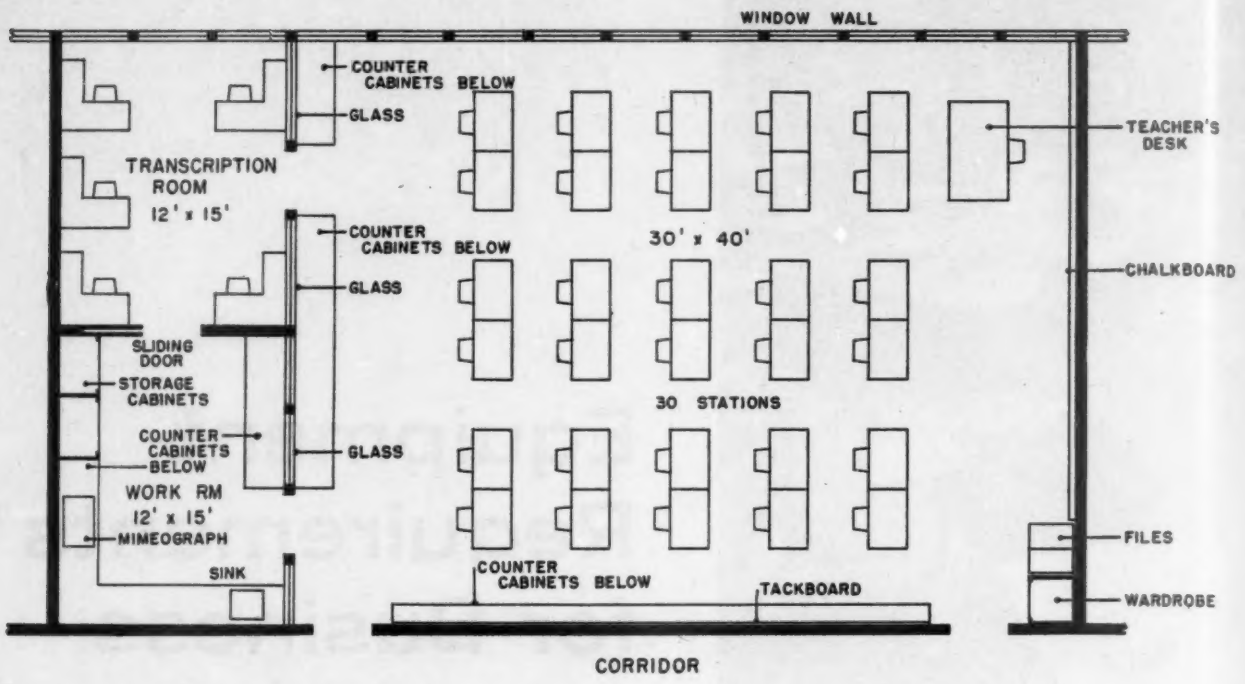
LIKE OTHER COURSE offerings of a secondary school, the business education department should be geared to needs of students and community. The equipment provided will implement these needs. Special studies can precede any planning of space and facilities for the business department. These studies will be particularly significant if they are carried out by the people who will be teaching in the department.

An important part of the community survey is a searching out of all opportunities for employment for high school graduates. Follow-up studies will accumulate information regarding the jobs held by graduates of the school.

Business education in the high school has two objectives: (1) to develop competences necessary for a business occupation; and (2) to develop the ability and understanding needed for the business practices of daily life. Decisions on equipment are basic factors in determining the classroom space allotted to business education. Educational specifications are developed from data collected from many sources. Certain general and specialized requirements should not be overlooked.

Flexibility. Secondary school design should permit any desired method of instruction. It should be possible to vary teaching stations and services at minimum cost and inconvenience to accommodate an increased enrollment and changing programs. Space is needed in the business education department for meetings of large groups of students. Two rooms could be divided with movable panels which open for one continuous area. Or rooms large enough to accommodate groups of one hundred or more may be made available.

Location of rooms. Noise from business machines should not disrupt the activities of other classrooms. Acoustical consideration and room relationships will reduce or eliminate undesirable sound carry-over. If rooms are to be used for school activities, they should be located where supervision will be available at all times. If adult evening



Suggested layout for a business machines laboratory. Main area is 30' x 40' and contains 30 student stations. Transcription room and work room are separated by glass partitions. Counter cabinets, tackboard and chalkboard line the walls.

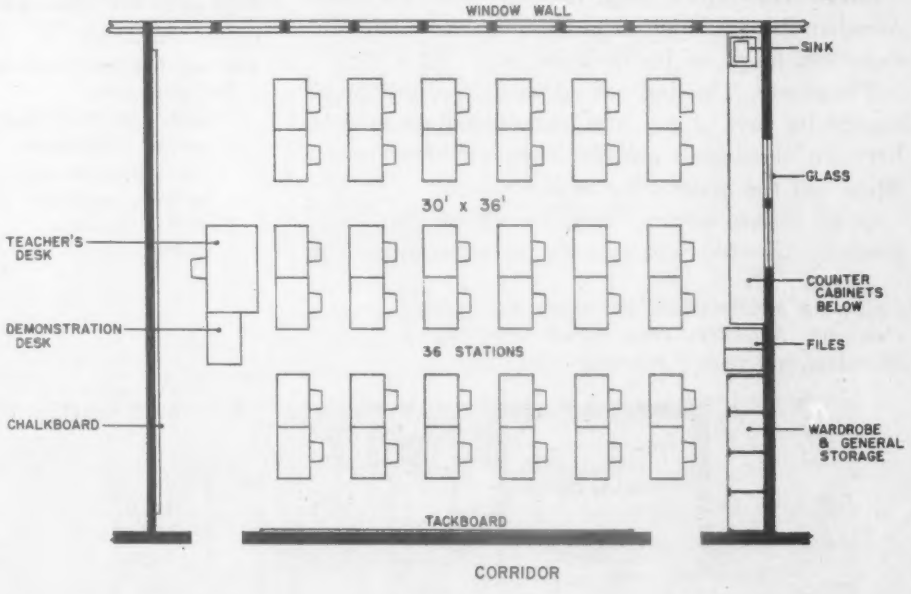
Business machines room of the Little Flower High School, Chicago, Ill. Electric typewriters complete equipment in the room. (Courtesy Brunswick Corp.)

Kranzten Studio Inc.

Howard Colby Studio

Some machines can be separated from the typing activity by being placed in adjoining rooms, as shown above.

Typewriting room plan, at right, is 30' x 36' in size and has 36 student stations. Room has a sink, counter and cabinets, files, wardrobe and general storage, tackboard and chalkboard.



classes are taught in the department, it should be accessible from the school parking area and without incurring traffic through other parts of the building.

Number, size, arrangement of rooms. Activities and equipment determine room size and arrangement in the business education unit. The capacity of the whole school, the desired business education program and the overall plan of the building will interact to influence the number of rooms provided and the arrangement of these rooms.

Chalkboard, tackboard, displays. Each room will need chalkboard and display space for the courses conducted there. Display board surface should be selected according to use. If displays are made by tacking material to the board, the surface should accommodate tacks without defacing its appearance. Pegboard might be used for displays, in the merchandising room particularly. Display rails above chalkboards and tackboards will be used to advantage.

Electric services. Each room should have electrical outlets for the operation of audio-visual equipment in the instructional program. There should be an outlet at the front of the room for equipment demonstrations by the instructor. In addition, the typewriting room and business machines laboratory need electrical outlets at each student station for the operation of electrical equipment.

Audio-visual requirements. Besides electrical out-

lets for audio-visual equipment, classrooms where films and slides are used need shades or drapes for darkening purposes. Permanent installations of rolling screens may be considered for some rooms. If television is part of the present or future program, due provision should be made.

Business education teachers can take advantage of many devices now available to improve instruction. Such equipment as the controlled reader, the tachistoscope, multiple installation of tape recorders or dictating machines, teaching machines, the overhead projector and the opaque projector should be studied as part of efficient instruction in business education courses.

The cooperative use of language laboratory equipment by the language and business education departments would greatly extend its value. One use of the laboratory by the business education department would be to set different shorthand dictation rates to meet individual differences in student ability.

Sinks. The typewriting, business machines and merchandising classrooms should have suitable sinks and be piped for both hot and cold water.

Telephone. The business education department should be part of an inter-communication system between classrooms and between the department office and the main office of the school.

Other requirements. Colors for classrooms, when properly selected will provide an atmosphere for each area. Wall surfaces should be able to withstand any possible marring from machine operations. Acoustical treatment of ceilings, especially in the typewriting and business machines rooms, will hold noise to a minimum and help maintain the best possible working conditions.

Heating and ventilating equipment will depend on decisions made for the school as a whole. However, those who plan business education facilities should make appropriate recommendations for their part of the building. Then the persons responsible for overall planning will have guidelines to follow in making heating and ventilating decisions.

Air conditioning is not yet common in schools. However, with more districts holding summer sessions there is likely to be a strong need for the installation of cooling systems in school buildings.

Specialized Classrooms

The following equipment lists for specialized business education classrooms provide a point of departure for those who are planning business education facilities.

Business Machines Laboratory

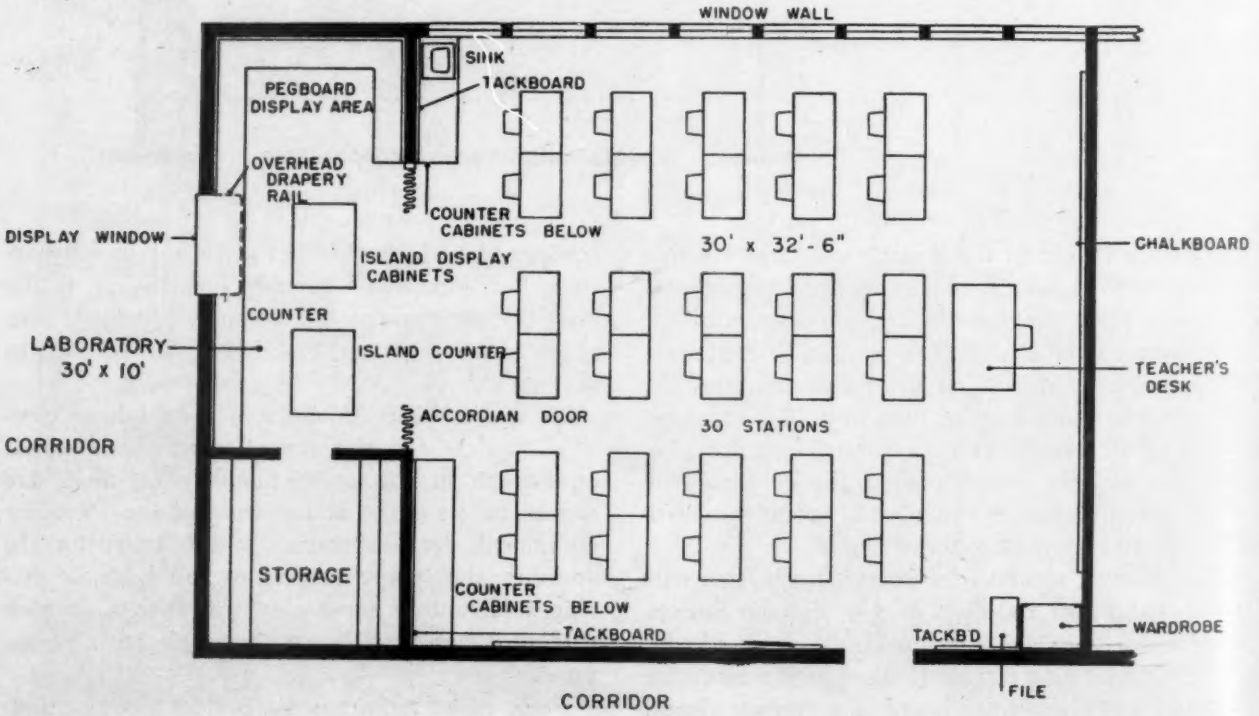
Potential uses:

Office practice, business machines, advanced typewriting, shorthand, bookkeeping. In small schools this classroom might be the only room provided for business machines and typewriters.

Desirable features:

Electric outlets at student tables, at front and rear of

Plan for a merchandising laboratory and general classroom. Accordion doors divide area into a laboratory and general teaching area.



room, in duplicating room, and transcription machine room.
Installation of jacks for multiple listening to shorthand dictation.
Installation of a master switch
Tables
Ample chalkboard and tackboard, installed in movable frames. Sliding chalkboards might be considered.
Provisions for darkening the room
Duplicating room and transcription machine room separate and adjacent to the laboratory.
Storage facilities
Counter working space in the duplicating room
Sink with swivel faucet for hot and cold water
Space for worktables in the classroom

Furniture list:
Individual student tables, adjustable, with chairs; or L-shaped tables with adjustable chairs
Teacher's desk and chair
Demonstration stand
File cabinets—two 5-drawer, letter size
Worktables

Equipment list:
The number and kind of machines will vary according to the objectives of the course or courses taught. Consider renting equipment which is to be used for a short time.
Adding machine, 10 key electric
Adding machine, full key electric
Bookkeeping machine, full keyboard
Calculator, electric key driven
Calculator, electric rotary
Calculator, printing
Duplicating machine, stencil, electric
Duplicating machine, fluid process
Dictating machine
Transcribing machine
Typewriters, electric
Typewriters, manual
Typewriter, long carriage
Key punch machine
Mimeoscope with set of styli, lettering guides, etc.
Paper cutter
Collator
Stapling machine and staple remover
Interval timer
Stop watch
Punch, 3-hole
Filing sets
Tape recorder
Phonograph
Overhead projector and screen

Typewriting Classroom

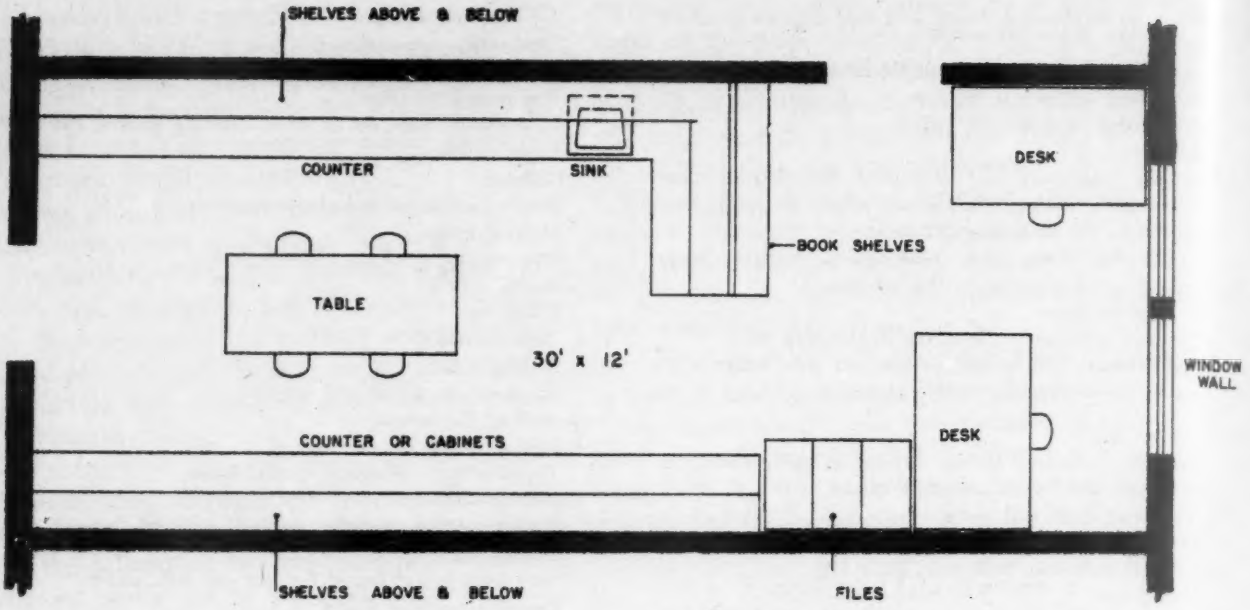
Potential uses:
Typewriting, shorthand, transcription

Desirable features:
Electric outlets at student tables for electric typewriters
Tables
Sink with swivel faucet for hot and cold water
Counter working space
This room may be separated from another classroom by sliding partitions which open up for large group instruction.

Furniture:
Individual student tables, adjustable, with chairs; or L-shaped tables with adjustable chairs.
Teacher's desk and chair
Demonstration stand
File cabinet—5-drawer, letter size

Equipment:
Typewriters, manual or electric
Interval timer
Stop watch
Phonograph
Tape recorder

In merchandising laboratory students practice different methods of display.



Office and storage space for the business education department. Desks, files and work surfaces are available for use by teachers. Sink may be included here.

General Business Room and Merchandising Laboratory

Potential uses:

General classroom, merchandising laboratory

Desirable features:

Merchandising laboratory is separated from the classroom by accordion-folding doors.

Display area in merchandising laboratory and classroom to accommodate various goods. Tackboard or pegboard may be installed also.

Storage facilities. Shelves and cabinets for storing different sizes of equipment.

Display window located on a corridor

Electric outlets for the cash register

Lights in display window

Furniture:

Individual student tables with chairs

Teacher's desk and chair

File cabinet—5-drawer, letter size

Island display case

Island counter

Magazine and pamphlet rack

Equipment:

Cash register

Paper

Mannequins

Office and Storage Space

Potential uses:

Office space for teachers, storage for materials used in business education classrooms, meetings of small groups.

Desirable features:

Space for file cases to store teachers' materials and data.

Student-teacher conferences may be carried on with a minimum of interruptions.

Availability of area as a workroom and for department meetings.

Furniture:

Teachers' desks and chairs

File cabinets—5-drawer, letter size

Worktable and chairs

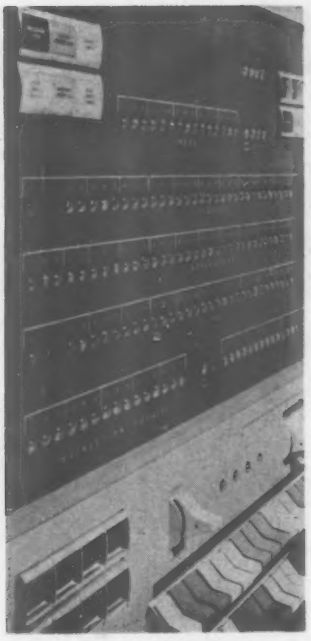
Typewriter table and chair

Equipment:

Fluid duplicator

Typewriter

The above recommendations are neither minimum nor optimum requirements for business education departments in secondary schools. They represent starting points for planning deliberations. It is hoped that newly planned departments will be able to improve on these suggestions.



Education Turns to Automatic Data Processing

by George G. Tankard, Jr.

Specialist, Educational Records and Reports, Office of Education, Department of Health, Education, and Welfare, Washington, D. C.

Dr. Tankard has a B.A. degree from Randolph Macon College and M.A. and Ed.D. degrees from George Peabody College. He served the public schools of Virginia for 10 years as teacher, principal, supervisor and administrator before joining the staff of the U.S. Office of Education. Dr. Tankard is also an officer in the U.S. Naval Reserve.

THE NATION IS ever more aware that its welfare, security and ultimate survival are largely dependent upon the quantity and quality of its citizens' education. A sizable portion of this education is imparted by elementary and secondary schools, and the management of these schools is delegated to local school boards and administrators. This task, of increasing magnitude and complexity, demands the highest quality of leadership and decision making ability.

Wise decisions, promptly made, and based on accurate and complete information, are essential to the intelligent administration and operation of schools. In many local school districts, officials are handicapped in carrying out their responsibilities by a lack of comprehensive, pertinent, accurate and timely information. Education, like business and industry, can and must turn to automatic data processing. Local school boards and administrators have recognized this fact for some time and the use of automatic data processing for school purposes is expanding at a rapid rate.

We propose to identify some uses local school districts are making of automatic data processing, and the implications these may have for data collection at state and national levels. We will examine national programs underway at the present time and point out desirable outcomes of an expanded use of automatic data processing for school purposes. Data programming, coding, machine descriptions, and other technical aspects of the process will not be discussed.

Basically, automatic data processing is the storing of individual items of information in a form whereby they may be rapidly and accurately retrieved and reproduced as single line items, as lists of items, or in desired combinations with other items, to serve as the basis for accounting, analytical and statistical computations. The familiar punched card is, at the present time, the heart of most systems and onto it is punched information that is to be used later.

A considerable compilation of data must be maintained in the records of a school district if it is to manage its affairs efficiently, provide sound stewardship of its resources, and plan its educational program intelligently. Generally speaking, this information is either financial and business-related or it is pupil and instructional program-related. In fact, optimum usefulness of automatic data processing equipment is attained only when all facts pertinent to school district operation are

integrated into a single processing system. For convenience and clarity, however, the two areas of application will be discussed separately.

Local Business Applications

Business applications divide into three broad categories: (1) payroll and staff personnel; (2) financial accounting; and (3) property accounting. In each category local district records are converted to punch cards which are then utilized in several ways.

For payroll and staff personnel purposes, cards are prepared for all persons employed. Punched onto these cards are details of assignment, job classification, name, personal characteristics, training and salary. Payrolls, budgets, age distribution analyses, employee records, directories and other personnel statistics are prepared from these cards.

For financial accounting purposes, cards record budget appropriations and allotments, purchases, disbursements and inventory issuances. The punch card records are used in writing checks, analyzing accounts, preparing various financial reports, and in preparing appropriation ledgers, financial statements by function and object of expenditure, and cost accounting statements in areas such as maintenance and transportation.

For property accounting purposes, cards are prepared for each item of property to show such facts as cost, date of acquisition, vendor, use and location in the district. This record effectuates property control, insurance coverage records, analysis of replaced items, and property statistics.

Several hundred school districts now employ automatic data processing for one or more of the purposes outlined above, and their number is increasing rapidly. These districts are able to record and utilize much useful information, with greater accuracy and in less time than un-automated districts. In addition, the economies that can be effected, the improved business procedures employed, and the efficiency of operation all point to the eventual adoption of automatic data processing by many school districts not presently taking advantage of such procedures.

Mobile accounting machines are in use at the Service Bureau Corporation, subsidiary of IBM.

Instructional Program Applications

Although expenditures for data processing equipment are frequently justified by business operations alone, many interesting and important applications are possible and practical in the area of pupil accounting and instructional programming. Such

Computers and print out machines are part of data processing center of the Service Bureau Corporation. Services offered include a system of automated scheduling, registration and grade reporting for secondary schools which do not have their own facilities for automatic data processing.

applications are presently in use or in process of development in a number of local school districts.

Pupil census information, for example, is recorded on a punched card for each child covered. Such facts as name, address, parent's name, attendance area, sex, birthdate, and disability characteristics are recorded. The punch card record is then used each year, as long as the child remains in the district, to compile enrollment projections, enrollment lists, attendance enforcement lists, and census statistics. The card also becomes the basic record for school registration lists.

When a child actually enrolls in a school, additional information such as class schedule, type of enrollment, school attended, grade level, and class assignments, is added to the basic card or punched onto additional cards. This record expedites enrollment, assignment, and scheduling procedures. Although exact applications may vary among elementary and secondary schools, the cards provide data for printing school directories, class lists, pupil schedule and course cards, and other reports necessary for the operation of a school. In addition, they form the basis for enrollment statistics, analyses of class size and teacher load, transportation statistics and planning, and other district analyses. At the present time, applications are confined mainly to the secondary school level.

Contractual data processing, like that offered by Service Bureau Corporation, is one solution to reduction of detail work by a school district.

NAME ANDERSON JAMES		CLASS 2	SCHOOL 1
SUBJECT TITLE	GRADE	CREDIT	
ENGLISH III	B	1	
U S HISTORY	B	1	
SPANISH 3	A	1	
H & P E 5-6	B	1	
ADVANCED MAT	A	1	
CHEMISTRY	A	1	
1 2 3	← PERIOD ENDING TOTAL CREDITS →	6	
NAME BACKMAN EMILE		CLASS 0	SCHOOL 1
SUBJECT TITLE	GRADE	CREDIT	
U S HISTORY	C	1	
ENGLISH III	B	1	
STUDY HALL			
H & P E 5-6	B	1	
FRENCH 2	C	1	
BIOLOGY	A	1	
1 2 3	← PERIOD ENDING TOTAL CREDITS →	5	

Permanent records can be prepared automatically from students' course cards.

Attendance information and marks received in class are added to the cards at designated periods, and the cards are then used for written reports to parents and for entries on pupils' permanent records. The information can be processed and analyzed to provide such data as grade distribution of pupils by teacher, by course and by school; analyses of courses being taken; pupil load; pupil achievement; graduation lists; class standing lists; failure and honors lists; and attendance information (average daily attendance and average daily membership by grade, by school, by age, by sex and by transported and nontransported pupils). Scores made by pupils on ability, aptitude, and achievement tests may also be added to the record whenever available.

Records of pupil performance and ability, when used in conjunction with other pupil information, provide an almost limitless base for analyses of curriculum practices and student progress. For example, pupil achievement may be analyzed in relation to factors of attendance, courses taken, and test scores. Likewise, the effects of grouping arrangements, accelerated classes, retention and promotion policies and other practices upon the performance of individual pupils and groups of pupils may be studied.

There are fewer individual schools and school districts using automatic data processing machines for record keeping in instructional areas than the

STUDENT PROGRAM
CENTRAL HIGH SCHOOL

STUDENT NAME	LUNCH	PERIOD	ROOM NUMBER	SUBJECT
ANDERSON JAMES L		1	028	ENGLISH III
		2	125	U S HISTORY
		3	047	SPANISH 3
		4		H & P E 5-6
Bring this schedule with you and report directly to classrooms as indicated. See accompanying letter for time schedule, bus routes and location of classroom.	5			LUNCH
		6	031	ADVANCED MAT
		7	006	CHEMISTRY

SEMESTER BEGINNING: 9 (MO.) 11 (DAY) (YR.)

JAMES L ANDERSON
123 SOUTH NORWOOD BLVD
FAIRFIELD CALIFORNIA

Student programs can be prepared in multiple copies and mailed if so desired.

number making business applications. Moreover, not too many districts have been able to plan an orderly expansion of their data procedures into a fully integrated program. As districts initiate or expand data processing programs, attention must be given to an overall system which will make fullest use of all data collected.

Automatic data processing increases the speed, accuracy, and efficiency of business operations. When adapted to the improvement of instructional programs, it may or may not cost less than methods currently in operation. Nevertheless, it frees the teacher of much clerical work, serves as the basis for improved analysis of the district's instructional program, and provides a wealth of information not previously available for guidance, counseling, curriculum planning and other instruction-related activities. When information is collected in a way which interrelates specific data (for example, teacher qualifications with subject taught, or projected pupil enrollments with school plant planning data) intelligent administrative decisions can be made to a degree not possible by any other means.

Programs of State Agencies

State education agencies must also have accurate and timely information if they are to perform effectively their administrative, instructional, and statistical functions. Much information is supplied to the state agency by local school districts, while other items originate at the state level. State education agencies make varied use of automatic data processing equipment. Prevalent among these uses

CENTRAL HIGH SCHOOL — OFFICE COPY

CENTRAL HIGH SCHOOL — HOME ROOM

CENTRAL HIGH SCHOOL — PARENTS COPY
STUDENT GRADE REPORT

TO THE PARENT OR GUARDIAN OF: ANDERSON KEN

THIS REPORT INDICATES THE STUDENT'S GROWTH AND ACHIEVEMENT. SCHOLASTIC GRADES ARE BASED ON CLASS PARTICIPATION, TEST GRADES AND WRITTEN WORK. CITIZENSHIP MARKS INDICATE ATTITUDE AND BEHAVIOR.
IF THERE ARE ANY QUESTIONS, FEEL FREE TO CONTACT ANY TEACHER OR THE PRINCIPAL EITHER BY COMING TO THE SCHOOL OR BY CALLING CONGRESS 7-6515.

CLASS	PERIOD	SUBJECT TITLE	QUARTER Scholastic	QUARTER Citizenship	QUARTER Times Absent	QUARTER Scholastic	QUARTER Citizenship	QUARTER Times Absent	SEMESTER Ex.	SEMESTER Pri.	SEMESTER Gr.	TEACHER	Sch
11	1	CHEMISTRY	B	S		B	S		B	B	1	MONKS	1
	2	SPANISH 3-4	B	S		B	S		C	B	1	LONG	
	3	ADVANCED MAT	B	S		B	S		C	B	1	MARTIN	
	4	U S HISTORY	A	S		A	S		A	A	1	ZEHNTNE	
	5	H & P E 5-6	A	S		A	S		B	A	1	HALISKI	
	6	ENGLISH 5-6	B	S		B	S	1	B	B	1	LIMBERG	

(DO WE HAVE YOUR CORRECT ADDRESS? IF NOT, PLEASE NOTIFY SCHOOL) PERIOD ENDING → 01 23 FIRST SEMESTER

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COOS BAY ORE

96

GRADING SYSTEM

SCHOLASTIC
A - MASTERY OF SUBJECT
B - GOOD QUALITY WORK
C - AVERAGE WORK
D - COMPLETED MINIMUM REQUIREMENTS ONLY
E - SUB-STANDARD QUALITY
F - FAILURE
I - INCOMPLETE
W - WITHDRAWN

CITIZENSHIP
S - SATISFACTORY ATTITUDE AND BEHAVIOR
U - UNSATISFACTORY CONDUCT, UNCOOPERATIVE

Grade report is prepared by high-speed IBM accounting machines and includes all recorded data for the student for the period indicated. This report can be designed in many forms.

Console type processing machine.

are: (1) preparation of master personnel records, teachers' certificates, directories of professional personnel in the state, (2) analyses of the qualifications of all teachers, (3) analyses of subjects being taught to identify teachers who are teaching beyond their certified fields, (4) property records, (5) master lists of all schools and school districts in the state, (6) school finance records, (7) school lunch program records, (8) pupil enrollment and attendance records, (9) transportation records, (10) records of curriculum and programs of study, and (11) special education records.

The use of automatic data processing procedures by state education agencies has increased significantly in the past two years. In 1958, approximately one-fourth of the states were using such methods; by mid-1960, this proportion had risen to approximately three-fourths. However, the extent to which state education agencies utilize automatic data processing equipment and the specific uses made of the data vary as widely as local practices. Present state practices range from an application limited to teacher certification data to full scale operations in most areas mentioned above.

The local school district is, of course, the source of most of the data required for state and national computations. When well planned data collection systems are in effect in the local school district, it becomes relatively easy for the state to obtain information vital to its statistical and administrative operations. Conversely, the state is severely handicapped wherever local collection is not adequate. Likewise, national statistical programs are dependent upon the quality of state and local data collection and reporting.

Federal Programs

If information is to flow smoothly from one collection point through the various levels of educational recordkeeping and reporting, it must be combinable and comparable with information from other collection points. It is essential that educational terms, measurements, and definitions be standardized, and that the information recorded and reported is based on these measures and definitions. The need for comparable data at the national level has long been recognized and two

CENTRAL HIGH SCHOOL

FAILURE LIST - FIRST SEMESTER 9TH GRADE

STUDENT NUMBER	STUDENT NAME	SEX	CL	HOME ROOM	PER	ROOM NO	SUBJECT TITLE	TEACHER	GRADE QTR	GRADE SEM
10045	ADAMS SANDI	F	9	2	3	16	ADV SPEECH	MILLER	C	F
10045	ADAMS SANDI	F	9	2	6	209	ENGLISH 7 8	GOUDE	F	F
20240	BARBER RICHARD	M	9	112	2	99	FORESTRY	KOKES	F	F
20240	BARBER RICHARD	M	9	112	3	208	PROBLEMS	MCLEAN	F	F
20240	BARBER RICHARD	M	9	112	4	209	ENGLISH 7 8	GOUDE	F	F
20300	BARKER REED	M	9	97	6	208	PROBLEMS	MCLEAN	F	F
20300	BARKER REED	M	9	97	3	111	ENGLISH 5 6	COVEY	F	F
30675	CLEMENS VIOLET	F	9	201	6	103	SENIOR MATH	MARTIN	F	F
30675	CLEMENS VIOLET	F	9	201	4	24	WORLD GEO	BURCH	F	F
30675	CLEMENS VIOLET	F	9	201	5	201	PROBLEMS	LARSEN E	F	F
40060	DARLINGTON CLAUDIA MAE	F	9	213	6	208	PROBLEMS	MCLEAN	F	F
40060	DARLINGTON CLAUDIA MAE	F	9	213	5	213	ENGLISH 5 6	LIMBERG	F	F

Academic progress, or lack of progress, is recorded on forms designed for individual schools or districts.

activities presently under the leadership of the United States Office of Education are evidence of this fact.

Since 1951, the Office of Education, working with interested national organizations, has been engaged in a cooperative project to identify and define items of educational information that should be collected and maintained in comparable form by school districts throughout the country. This has resulted in the State Educational Records and Reports Series*, including handbooks which standardize terminology and definitions for state-reported items, school finance, school activity accounting, and school property accounting. Handbooks are being developed for pupil and staff personnel accounting, and other areas are planned for future development.

Title X of the National Defense Education Act of 1958 provides funds, on a matching basis, to state education agencies for the improvement of their educational information programs. Among the many activities of participating state agencies are the installation or improvement of automatic data processing systems at the state level and the implementation of the standardized terminology presented in the State Education Records and Reports Handbooks.

CENTRAL HIGH SCHOOL

HONOR ROLL - G. P. A. * Straight A's

CL.	STUDENT NUMBER	*	STUDENT NAME	G.P.A.	NO. OF CRS.
11	20225		ANDERSON JAMES	4.00	6
11	31065	*	COTTELL ANGELA	4.00	5
11	40435	*	DONALDSON KATHLEEN	4.00	6
11	120210	*	LARSEN JERRY	4.00	5
11	180345	*	RIGIK ELNORA	4.00	6
11	130075	*	MC CAULEY MADALINE	4.00	6
11	180585	*	ROSEMAN TAMARA	4.00	6
11	180660	*	ROTHE MARY	4.00	6
11	20625		BELL BARBARA	3.83	6
11	80315		HARRIS MARVIN	3.83	6
11	130735		MAGUIRE KATHIE	3.83	6
11	132010		MUENCH BETTE JO	3.83	6
11	60045		FARR SUSAN	3.83	6
11	110120		KELLEY NANCY	3.83	6
11	130375		MC DONALD KAREN ANN	3.83	6

Automatic processing produces data in many forms. (All illustrations courtesy IBM's Service Bureau Corporation.)

As school administrative units grow larger and more complex, and as educational needs are more pronounced and more the concern of state and national agencies, it is increasingly important to have accurate, meaningful, and timely information available for decision making at all levels. Local educators are becoming aware of this fact and are turning to automatic data processing for assistance. State and national governments are taking positive steps to encourage such moves and are expanding the use of automatic data processing for their own operations. All this means that, in the not too distant future, we may anticipate significant improvements in the quantity and quality of information about education.

* The following handbooks were printed by the U. S. Government Printing Office, Washington, D. C., for the U. S. Department of Health, Education, and Welfare, Office of Education: Reason, Paul L., Foster, Emery M., and Will, Robert F. *The Common Core of State Educational Information.* (Handbook I, Bulletin 1953, No. 8.) Reason, Paul L., and White, Alpheus L. *Financial Accounting for Local and State School Systems, Standard Receipt and Expenditure Accounts.* (Handbook II, Bulletin 1957, No. 4.) Samuelson, Everett V., Tankard, George G., Jr., and Pope, Hoyt W. *Financial Accounting for School Activities.* (Bulletin 1959, No. 21.) Reason, Paul L. and Tankard, George G., Jr. *Property Accounting for Local and State School Systems.* (Handbook III, Bulletin 1959, No. 22.)

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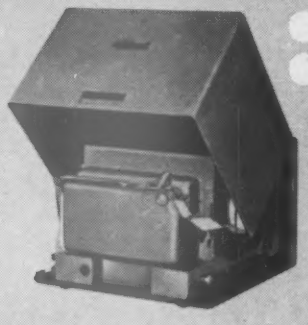
Bro. George F. Meskill S.M.

Manager
University of Dayton Bookstore



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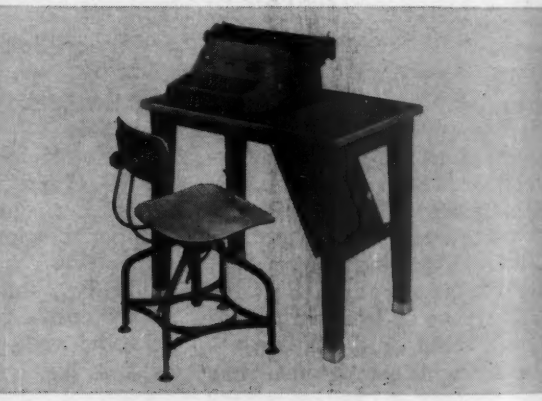

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EDITORIAL

Purdue University's Recreational Gymnasium	L 1
Activated Philosophy of a Student Union	L 9

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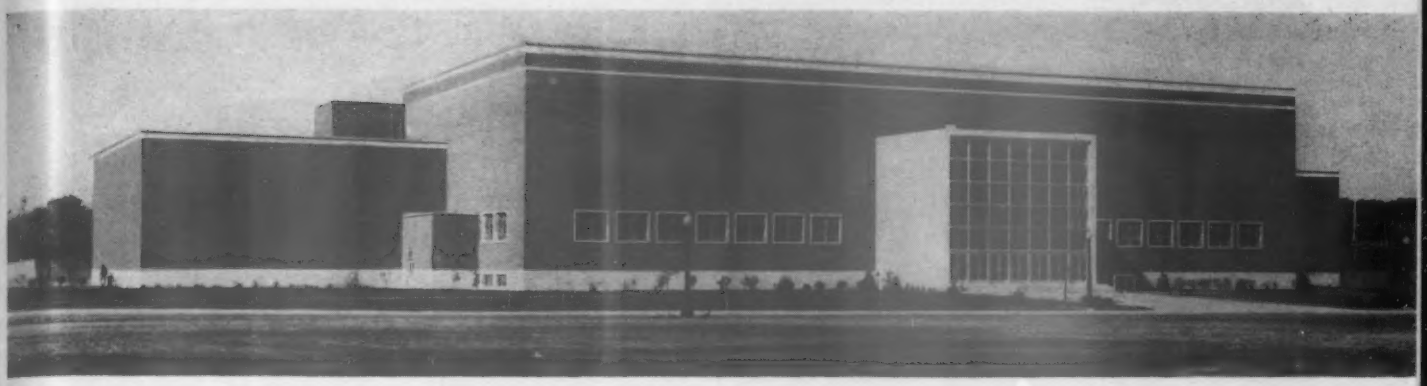


About 95 percent of all Purdue students utilize facilities of the Recreational Gymnasium at one time or another. Building was designed by Walter Scholer and Associates.

Purdue University's Recreational Gymnasium

by George W. Haniford

Associate Intramural Director and Manager, Recreational Gymnasium, Purdue University, Lafayette, Indiana

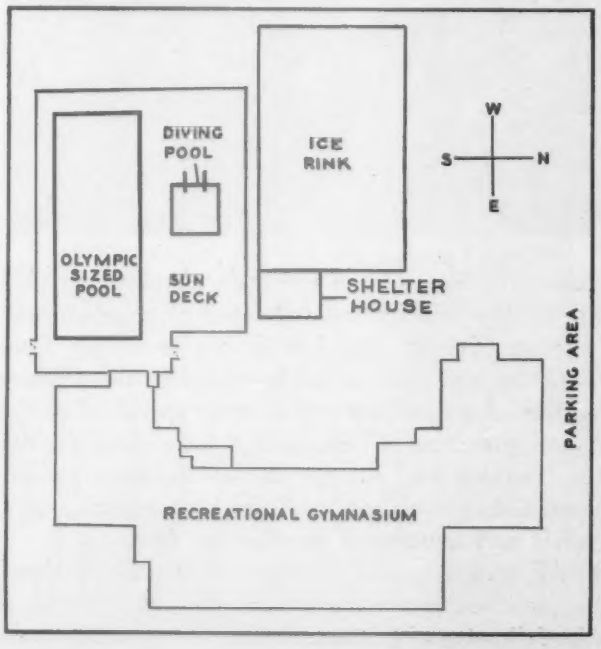
Mr. Haniford holds B.S. and M.S. degrees from Purdue University and is currently completing work on his doctorate at Indiana University. He is vice president of the National Intramural Association.

ONE OF THE NEWEST buildings on the Purdue University campus is the Recreational Gymnasium. Construction of the two and one-half million dollar co-recreational building was begun in the spring of 1954 and it was opened in September, 1957. After more than three years of constant use, the building has been evaluated by the staff and the students themselves as an important part of the Purdue campus.

The facility was originally planned as a men's intramural sports structure. However, it was decided to finance construction costs from student fees and it became necessary to plan the building for utilization by all undergraduate students.

The Recreational Gymnasium is a unique establishment for many reasons: (1) the costs for constructing and equipping the structure were financed through a bond issue being retired wholly from student fee income; (2) the building, strictly speaking, is not a gymnasium but rather is a physical recreation center for undergraduate students; (3) facilities are reserved for undergraduate activities and no varsity sports meetings or academic classes are held here; (4) students are able to engage in individual, dual or team sports, informal and co-recreational activities; (5) facilities are available to

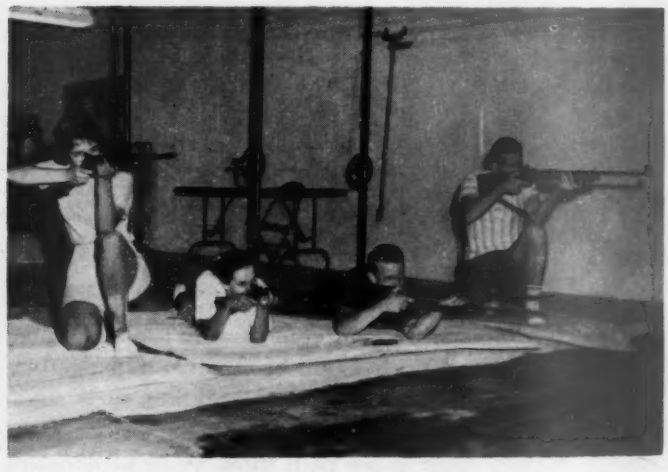
Outdoor facilities of the gymnasium include an Olympic-size pool, diving pool, sun deck and ice rink.



Purdue University Photographic Service

Swimming pool is five feet deep at center, three feet deep at each end. Diving pool is 35 feet square and 12 feet deep. Golf range with driving nets, putting greens, sand trap and pitching devices, is in the basement.

Rifle range has eight firing points. Rifles are furnished, with ammunition available for practice.



other members of the university family, provided there is no interference with student requirements; (6) an advisory board, with representation from both the staff and student body, assists the director in the administration and general operation of the gymnasium; and (7) the student recreational facility fee entitles students to use all facilities of the gymnasium with no additional charges. Locker, towel and equipment services are free.

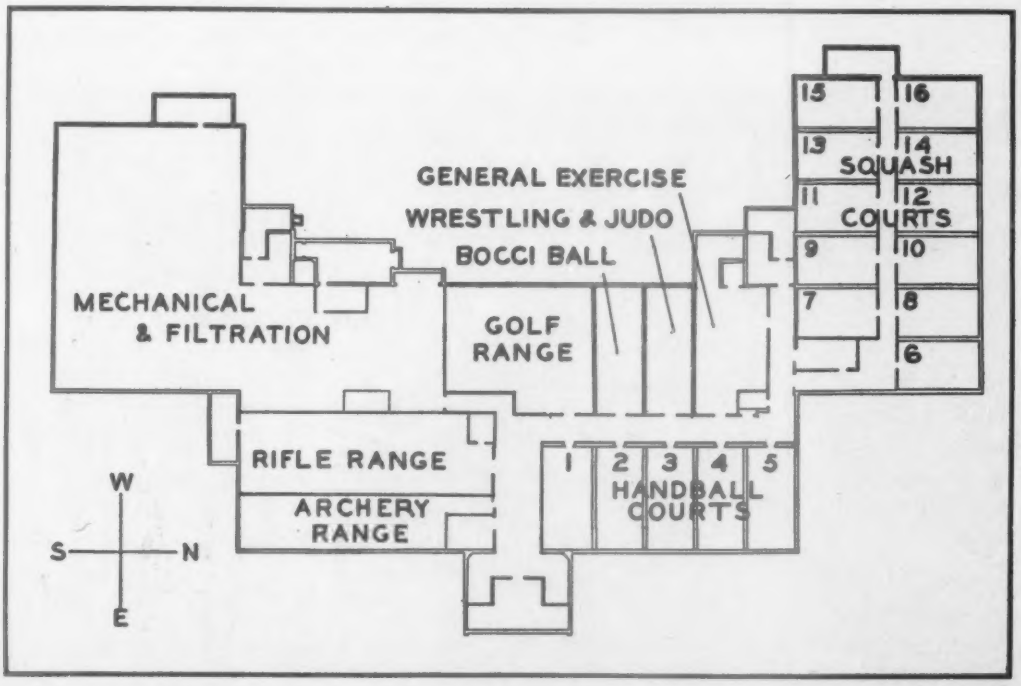
All programs and activities of the Recreational Gymnasium are conducted for the achievement of the following objectives:

1. To provide all students with campus leisure time recreational opportunities.
2. To assist students in their development of social and ethical qualities.
3. To encourage all students to maintain physical and mental fitness.
4. To arouse students' interest in the skills and pleasure of both present and future leisure time recreational pursuits.

All undergraduates are able to engage in competitive team, individual and dual sports, sports clubs, informal, non-competitive, social and co-rec-

Popular feature of the Purdue University Recreational Gymnasium is the outdoor artificial ice skating rink. A shelter house is nearby.

Basement level of the building houses mechanical and filtration equipment, rifle range, archery range, general exercise area (weight lifting and heavy equipment), handball courts, golf range, wrestling, judo and bocci ball rooms.



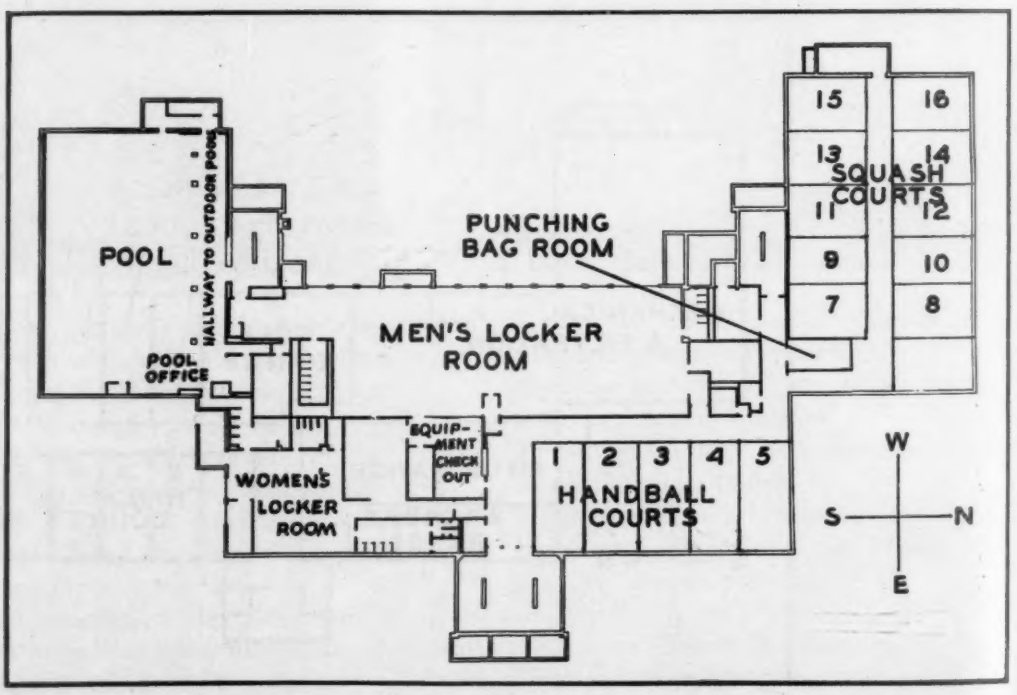
Indoor swimming pool (25 yards long and 3 to 12 feet deep), locker rooms, equipment checkout, and galleries for handball and squash courts are located at ground floor level.

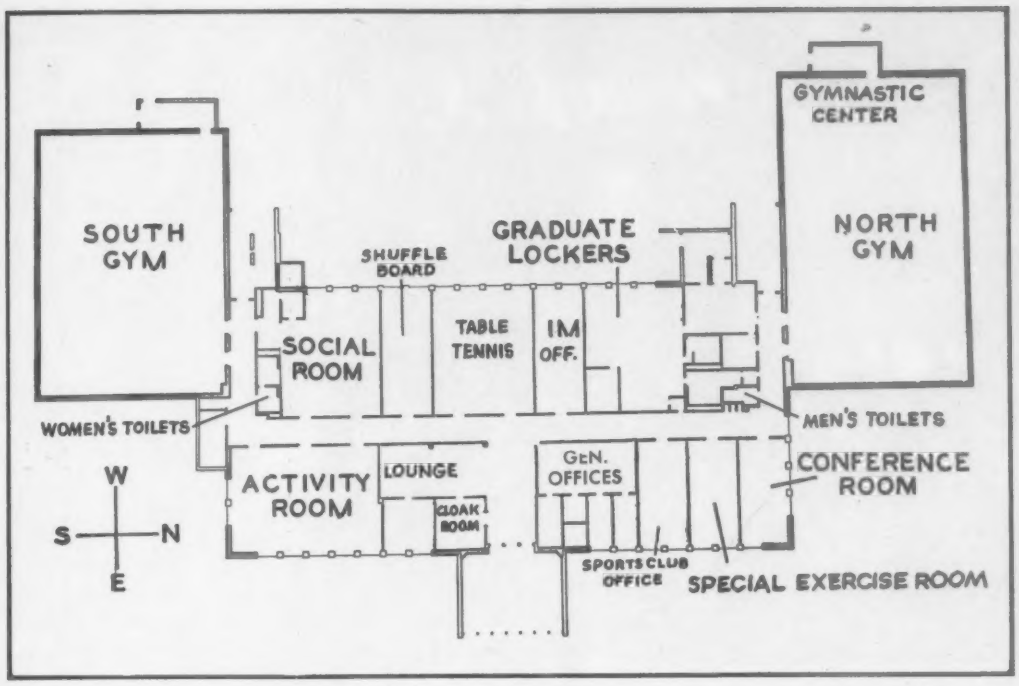
reational activities. Free play equipment is available at all times and includes basketball, badminton, volleyball, table tennis, shuffleboard, darts, squash, handball, weight lifting, golf, bocci ball, paddleball, gymnastics and boxing.

Some free play activities require certain supervision and are thus only open during scheduled periods. Included here are roller skating, rifle practice, trampoline, archery, judo, fencing and swimming. Square dancing, popular dancing, small games like chess and checkers, ice skating, roller skating and swimming come under the category of social activities. Organized student groups may reserve the roller skating rink, indoor swimming pool or dancing room for special affairs.

Students learn new skills and games by participating in non-credit classes and training sessions conducted by the Recreational Gymnasium staff. The men's intramural sports program offers competitive sports and many activities are conducted in the gymnasium. Both men and women participate in organized and unorganized competitive sports. Intramural sports clubs give students a chance to make friends and have fun while learning new sport skills.

At Purdue we feel that we are perhaps years ahead of the educational world in providing our students with excellent facilities and opportunities for strenuous free play activity. One of the most remarkable things about the building is the way students accept it as theirs, more so than any other campus facility. They're buying it, it's of, by and for them. In three years of operation we have had





Two large gymnasiums, social and activity rooms and administrative offices are among areas of the building's main floor.

no vandalism, no act of defacement. Equipment is handled with respect.

We have taken the emphasis off winning to place it where it belongs—striving together, enjoying the games and blowing off excess energy. We have tried, and I believe successfully, to bring in an element of spontaneity. When a student feels like doing this or that, we have the place and the equipment.

A general operational policy for the Recreational Gymnasium was developed through cooperative effort by the executive dean of Purdue University, the business manager and assistant treasurer, the director of intercollegiate and intramural athletics, the associate intramural director, the assistant intramural director and the head of the department of physical education for women. The university president reviewed the general operational policy and it was approved by the board of trustees.

It was determined that the Recreational Gymnasium would be primarily for student use. Its facilities are available to other members of the univer-

Students have accepted the Recreational Gymnasium wholeheartedly as theirs. Equipment is in constant use and is handled with respect.

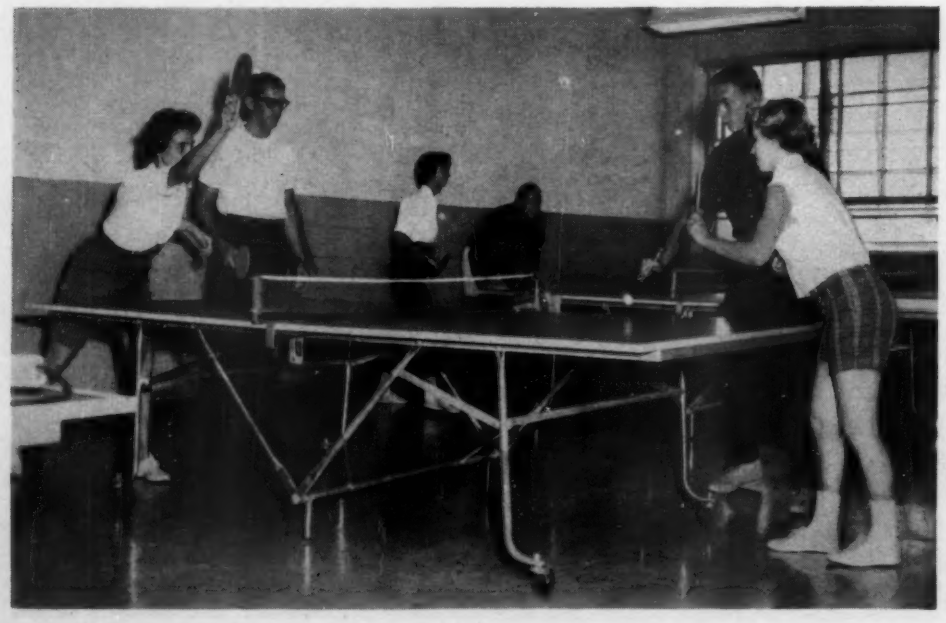
Students may use the building any time it is open, but priority is given to organized student intramural and recreational activities.

sity family only if student activities are not interrupted. Students (undergraduates and graduates who have paid the recreational facilities fee) use the building any time it is open during the period for which the fee is paid. Priority is given to organized student intramural and recreational activities.

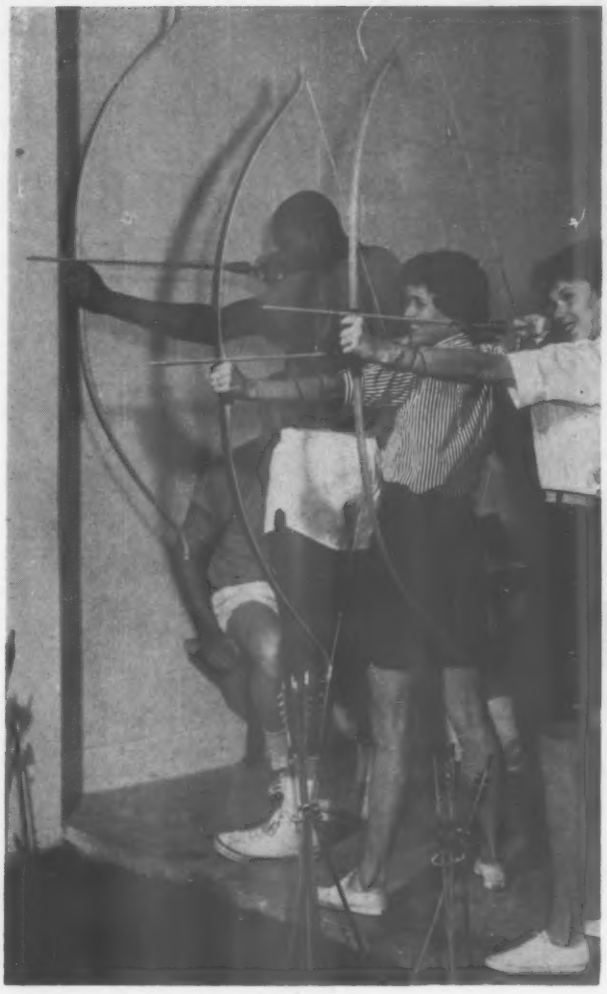
Student wives or husbands (who have paid the student fee or hold a student wife/husband passport) are subject to regular students' use restrictions. Otherwise, student spouses are charged according to a fixed fee schedule. Student guests must pay a one-time use fee.

Student and staff children are not permitted in the building or grounds except for special programs approved by the Recreational Gymnasium board. The fieldhouse and women's gymnasium are available to staff members, and their wives may use the women's gymnasium subject to the availability of facilities.

Organized student groups have access to the Recreational Gymnasium without charge if the general program and schedule permit. Organized staff groups are scheduled only when there is no conflict with student schedules. A charge is levied to cover direct and indirect costs. All others, whether conference attendants or outsiders, have no access to the building during the school year.



Students learn new skills and games by participating in non-credit classes and training sessions conducted by the gymnasium staff.



A workshop is open to archery club members who are interested in making equipment.

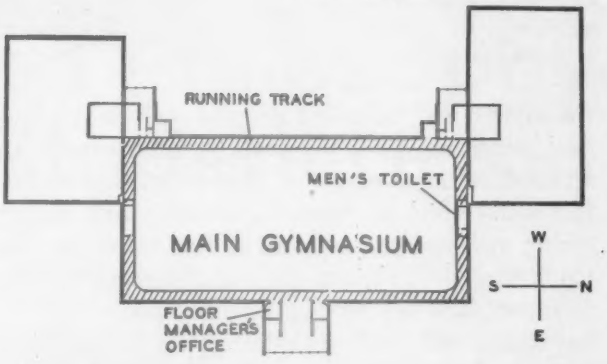
However, exceptions are made with the approval of the manager.

Outdoor pools are available to students on the same basis as the indoor facilities. During summer sessions an additional fee is paid for admittance to the pools. Non-students may use the pools from the day after classes are closed in the spring until the day before orientation and fall registration begins. Fees are paid according to a fixed schedule.

The director of intercollegiate and intramural athletics is responsible for the administration and general operation of the Recreational Gymnasium and pools. He has an advisory board, composed of certain staff members and selected students, and he or his authorized representative serves as chairman of the board. The associate intramural director is the manager of the building.

Outdoor facilities include 35 acres of playfields, a 50-meter steel swimming pool (five feet deep at

Gymnasium on the second floor has four collegiate regulation basketball courts and 1/10 mile track.



Free play equipment for basketball, badminton, volleyball, table tennis, shuffleboard, bocci ball, etc., is available at all times.

Spacious sun deck surrounds the outdoor swimming pools which are open all summer.

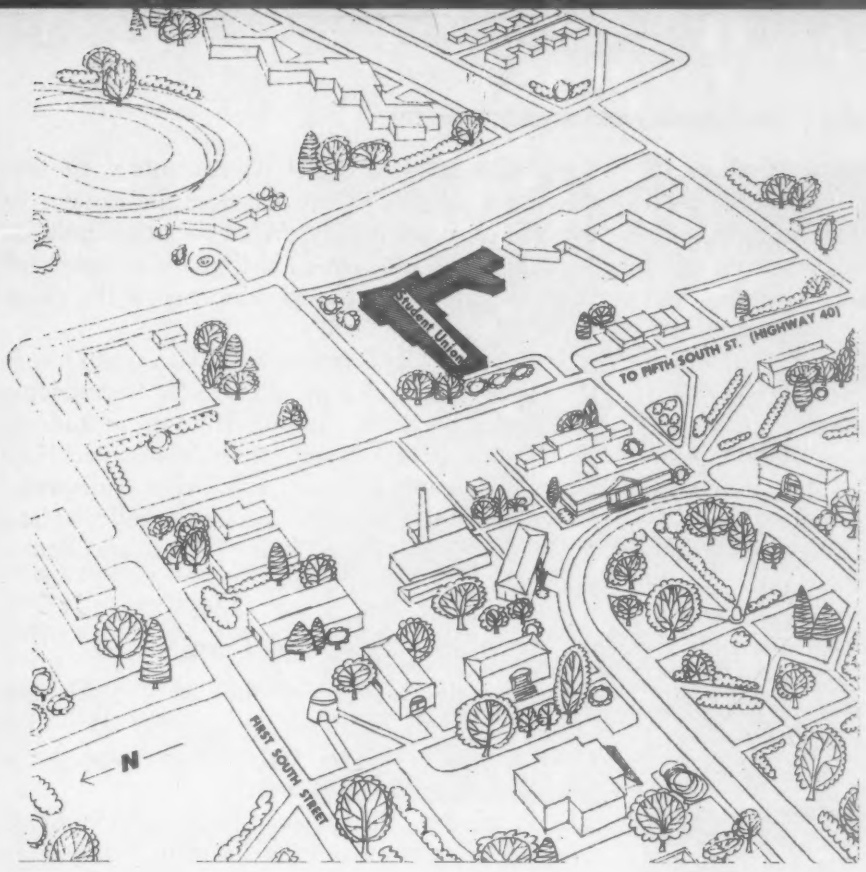
the middle and three feet deep at each end), a sun deck which surrounds the pools (18,012 square feet), an artificial ice skating rink (184 feet long and 114 feet wide) which becomes four tennis courts during spring and summer, a brick shelter house for the ice skating rink (2000 square feet of floor area) with restroom facilities serving both the pools and the ice skating rink, and an asphalt parking area which accommodates 600 automobiles.

Indoor facilities are located on four different levels. Golf, archery and rifle ranges, handball and squash courts, general exercise, wrestling, judo and bocci ball rooms are located at the basement level. On the ground floor are the indoor swimming pool, locker rooms, more squash and handball courts. The main floor of the building houses two gymnasiums, social and activity rooms, offices, table tennis, special exercise and conference rooms. A running track, main gymnasium and floor manager's office take up most of the second floor's area.

The costs for constructing and equipping the Recreational Gymnasium are being financed through a bond issue which is, in turn, being retired from student fee income. The cost of the program is supported by student fee income, the men's intramural athletic budget, swimming pool receipts, and revenue received from non-students.

Approximately 95 percent of all Purdue students utilize facilities of the gymnasium building. Statistics show that from September 20, 1959 through May 30, 1960 the frequency of use was 125,774. In addition, more than 6,000 students participated in the men's intramural program for a total of 48,000 utilizations.

The Recreational Gymnasium, entering its fourth year of use, is already bulging at the seams. And well it might, for it is more than a building—much more.



New Union at University of Utah campus opened its doors on New Year's Day, 1957.

Activated Philosophy of a Student Union

by Douglas O. Woodruff

Union Director, University of Utah, Salt Lake City, Utah

Mr. Woodruff attended Utah State Agricultural College, University of Utah and New York University Graduate School. He has been at University of Utah since 1927, becoming director of the union in 1931. Mr. Woodruff served the Association of College Unions as President in 1948.

A STUDENT UNION is successful when it gives each member of the college family a reason for coming to the center. To become a genuine community center, the social and cultural heart of the campus, a union responds effectively to the needs and interests of a college population at leisure. It draws together facilities and activities for everyone in the college—students, faculty, staff, alumni and their guests.

First, it provides places and means for meeting friends, for conversation, for lounging, for reading, for dining and refreshment. Dating and social events take place here. Young people participate in active games. The rooms and equipment incite activity and encourage the congeniality and friendship that come from working together in common projects. The union offers facilities which introduce students to enduring satisfactions of the arts, books, hobbies and the productive use of leisure.

Certainly it is a mistake, in planning the union, to treat it as a catch-all for miscellaneous college needs without regard to their appropriateness. The union is founded upon a core of activity essential to the campus.

The college community center has become a highly complex and specialized building. There is nothing quite like it. It is not patterned after a club, hotel or civic community center, but embodies characteristics of all of them. A union is much more inclusive and individual in its facilities. It may house club facilities, food services, hotel, theater, art gallery, meeting rooms, craft and hobby shops, game rooms, outing equipment, ballrooms, swimming

pool, ice skating rink and a multitude of offices, all under one roof; or it may include a special combination of these functions.

Secondly, any union, to be of maximum use to a campus, reflects and strengthens the traditions and life of its institution. It serves special recreation interests and community needs on an individual basis.

Union planning begins with careful study of a college's own needs, formulation of a guiding philosophy and program of what the structure is to do for the campus. This procedure is better than looking for pat answers in other union plans. A thorough-going survey of the local campus situation and careful sampling of students to learn their facility preferences will be useful, almost indispensable.

How many students are housed in organized houses and have a social life—and dining rooms—of their own? What do students do locally for social life and recreation? What do students want that they do not have? What else does the campus or town offer recreationally? What facilities could be logically shifted to the union to make it complete? What objective in informal education is the union expected to accomplish?

How will each campus organization make use of the new center and how often? Will townspeople and conference groups use it? How many students live at home or at a distance from the campus? How many commute? Future enrollment prospects? Ratio of men to women? What are the college plans for further dormitories? Theater? These and similar facts will have to be known.

Trapezoid tables encourage flexible use of space and can be arranged for effective meeting and discussion techniques.

Principles and Cautions

It is not possible to prescribe planning solutions without a study of the local situation. However, some typical principles and cautions suggest the nature of a new campus center:

1. In selecting the site and planning the building, start with the assumption of growth. No one can have the last word on what the college may want the union to be and do ten or even twenty years from now.

2. Study each facility for possible multiple use. Where multiple purpose is genuinely feasible, make sure that the basic design and accessory space and equipment will work for the purpose intended (i.e., adequate serving space and table and chair storage for the ballroom when it is to double as a banquet hall; an enclosed, fire-code-approved, projection booth for the ballroom for illustrated lectures or motion pictures; etc.). Do not assume that all rooms can serve multiple purposes. It is a serious mistake to plan a large lounge on the theory that it will serve as a dance hall. There are many other instances where multiple use does not work.

3. Consider that peak loads are characteristic

Room dividers designed in new plastic materials transmit opaque light but maintain privacy. Plastic covered couches, portable planters and wall decorations add color and personality to conference rooms (see photo below).

of college dining and union social occasions. Arrange and relate facilities (checkrooms, lobby, meeting rooms, dining rooms, ballrooms, circulation and line-up space) so that a given facility can expand for peak loads, or contract for normal use.

4. A union is no longer just a place to eat and meet. It is broadly concerned with the constructive employment of student time outside the classroom. It represents experience in a way of living and has facilities for cultural and creative pursuits (theater, auditorium, music rooms, library, art display space) for hobbies, photography, crafts, for motion pictures and for outdoor activity.

5. Plan student office space flexibly and avoid permanent commitments to prospective office holders. Private student offices are expensive and little used. Many student organizations can share a common office area. Others need only storage lockers for belongings and accessible files.

6. Provide plenty of storage space. There is never enough storage area and what there is of it is usually not in the right place. Hundreds, even thousands, of dollars in servicing costs can be saved annually through experienced planning here.

7. Students are rarely interested in just a place to sit down. Plan rooms and lounges where students can do something. Avoid large formal lounges (because students avoid them).

8. Entrances, lounges, browsing room, music rooms, game rooms, and telephones should be easily supervised by the union staff.

9. Plan interior circulation so that large crowds attending an organized event will pass a control point (i.e., for collections of admission tickets). At the same time, make sure that other persons can go to different parts of the building without passing this control point.

10. There are physical means to social (and financial) ends. Many facilities fail in their purpose because they lack air conditioning, acoustic treatment, appropriate lighting, or attractive furniture, etc.

11. Investigate floor and wall coverings, equipment and furnishings that will work best in a

Art can be made an everyday experience for those using the student union. Works of art can be exhibited in corridors and serve as room dividers.

student union. Few buildings receive harder and more continuous use.

12. There are many ways to save building space and labor and maintenance costs—elevators, tray conveyors, automatic waste disposals, floor and wall finishes, public address system, combining of service functions at control desks, centralizing dining and service facilities, etc.

13. Don't make entrance into the center difficult. No service institution which wants people to use its facilities should impose the obstacle of a monumental flight of steps at the entrance, or limit the approach to one entrance on one level (where the terrain indicates otherwise).

Creative Use of Space

America's institutional building boom has been resolving many old problems of space and maintenance. However, as these buildings become part of the campus scene, new problems are created. How to produce attractive yet functional buildings with limited financial resources is one of the most challenging of these problems. Many of us have found, when appraising new campus buildings, that the new edifice falls short of the ideal structure originally pictured. Some of this effect can be offset in the early stages of planning. A few extra dollars, carefully expended, could have eliminated the institutional atmosphere of many a new building.

Special interior decoration does much to over-

Placing of tables and chairs in an available corridor creates a readily accessible games area.

come an institutional setting. Large areas can be treated to cut down vast vistas. Furnishings can be selected and arranged for comfort, utility and good looks too. Here are some suggestions for attractive surroundings in the student union.

Trapezoid tables. The trapezoid table has become a real boon to meeting rooms. The tables encourage flexible use of space and can be arranged for effective meeting and discussion techniques. The relative low cost of these tables also contributes to their popularity.

Room dividers. New plastic materials have been incorporated into room divider design, creating opaque effects that transmit light but maintain privacy. Small, intimate areas are possible within a larger room. At the same time, the dividers contribute substantially to a room's decor without diminishing its effectiveness as a large meeting or lounge area.

Dressing up the conference room. Row-on-row conference rooms, with folding chairs and presiding tables, present a depressing and unimaginative

Ideally, lounges should be comfortable, serve as a gathering place for students and sometimes double as a work space.

Saans Photography

picture. Plastic covered couches, portable planters and wall decorations will give additional color and personality to these rooms.

Lounge, working area. Student unions usually have many lounges—for commuters, faculty, reading, music listening, television, etc. Ideally, the lounge area should be comfortable, serve as a gathering place for students, and sometimes double as a work space. Plastic covered chairs and low tables with plastic tops are recommended. This furniture will stand up under hard wear. Lounges can serve as informal meeting spaces and also as office space for personnel working with students.

Corridor lounge. When universities and colleges have a large on-campus population, there is less need for expensive lounging areas in the student union. A corridor lounge will then meet the sitting and chatting needs of students who have access to other lounges at residence halls. The corridor lounge represents a money-saving and space-saving design technique. Yet it helps create warmth and appeal within the building and eliminates the enclosed lounge and sterile corridors common in many institutional buildings.

Finding a place for art. For those of us concerned with making art an everyday experience for the individuals using our buildings, there is the old question of an art gallery versus art hung throughout the building. One way to resolve this problem is to make picture galleries of the corridors. Dividers of plywood and cork exhibit works of art and can be removed quickly when the corridor is needed for other purposes. In addition, the dividers break the large corridor into small conversation areas. There is no serious impairment of an architect's desire to create a feeling of spaciousness in the building.

Games area. Once again a large empty corridor can be converted to functional use, by placing the games area here. The area is thus easily accessible to students and minimizes administrative problems. Colorful plastic chairs and table tops are not only functional in the games corridor but contribute to the pleasantness of the building.

Tables with plastic tops and comfortable chairs are recommended for student work spaces.

Diverse activities take place at one time in college and university student unions. The multiple purpose of the structure should not hamper its appearance, function or educational purpose. There are many ways to create a successful building. A few of them have been explored, but planners and designers are encouraged to go on from here to further achievements.

FAIR-PLAY SCOREBOARD CO.

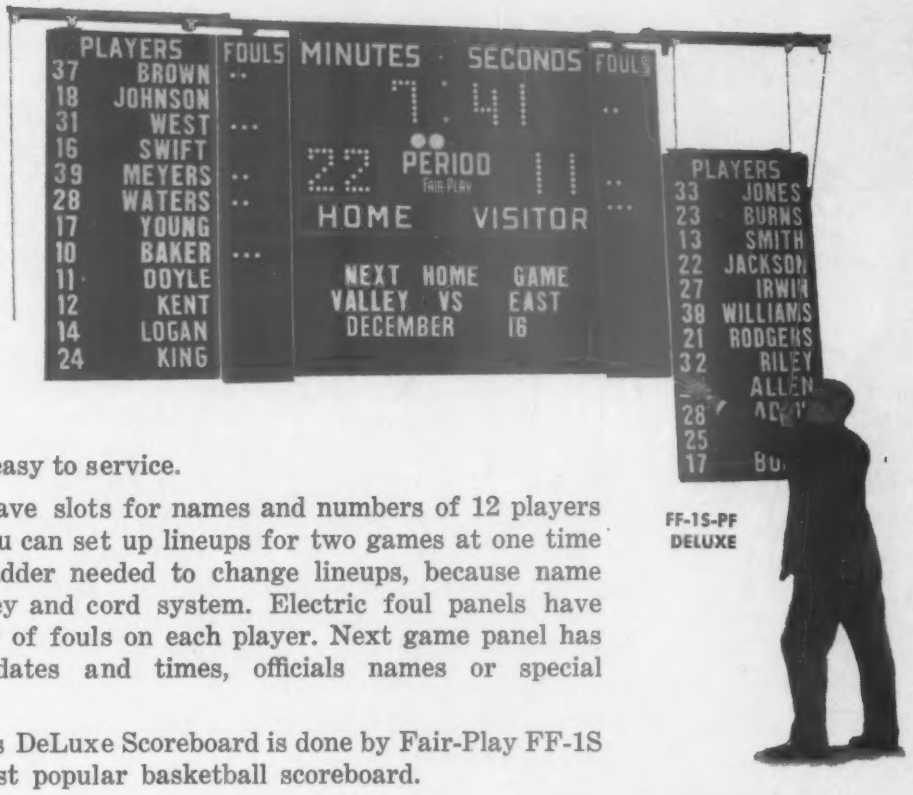
Manufacturers of Electric Scoreboards and Timers

P. O. Box 359, Des Moines 2, Iowa

FAIR-PLAY

ELECTRIC BASKETBALL SCOREBOARDS

This DeLuxe Scoreboard tells the complete scoring story in your gym—team line-ups, score, period of game, fouls charged, time left for play, and next game data — everything in one scoreboard that's dependable, accurate, easy to install, easy to operate, easy to service.



FF-1S-PF DELUXE

Reversible name panels have slots for names and numbers of 12 players on each side of each panel so you can set up lineups for two games at one time —ideal for tournaments. No ladder needed to change lineups, because name panels are suspended with pulley and cord system. Electric foul panels have five red lights to show number of fouls on each player. Next game panel has plenty of room for game dates and times, officials names or special announcements.

Scoring and timing for this DeLuxe Scoreboard is done by Fair-Play FF-1S standard unit—the world's most popular basketball scoreboard.

FF-IS SPECIFICATIONS

Fair-Play scoreboards come ready to operate and installation is simple. Brackets and eye bolts furnished for attaching to wall or suspending.

Choice of 9" or 12" numbers. Scoreboard with 9" numbers measures 5' x 3" x 6½", weighs under 100 lbs. Scoreboard with 12" numbers is 5' x 4' x 6", weighs 100 lbs.

Number banks are made with seven lights vertical, four horizontal—to form most legible, block-type numbers. Numbers formed on red plastic for greater visibility at sharp angles. Numbers formed by 25 low-voltage (12 v.) lights.

Words MINUTES, SECONDS, HOME and VISITOR on backlighted plastic are removable. School or team name may be substituted for HOME at slight extra cost; GUESTS instead of VISITOR available at no extra cost. Period of game is indicated by four vari-colored 3" lenses.

Scoreboard controlled by light-weight, single-piece pressed aluminum panel with baked enamel finish. Designed for use by one or two operators. Ten-foot cable attached, more if specified. Control panel has push-button, progressive scoring for rapid corrections. Clock quickly reset by button for new periods or overtimes.

New loud Banshee Buzzer mounted on board. Super-special resonating Federal No. 55 horn available at extra cost. Extra horn may be attached at control. Clock stops automatically and sounds horn. Horn can also be sounded at will.

SCOREBOARDS FOR OTHER SPORTS

From the Rose Bowl to Valley High School, Fair-Play adds spectator appeal to the game. FB-50-A2 Scoreboard (shown above) is one of the best-known football scoreboards. The world's largest electric scoreboard manufacturer, Fair-Play makes scoreboards for all sports requiring timing or scoring: football, basketball, baseball, track, hockey, wrestling, soccer, swimming, etc. Write for details, or ask for

BASKETBALL CATALOG 28
FOOTBALL CATALOG 76
BASEBALL CATALOG 81

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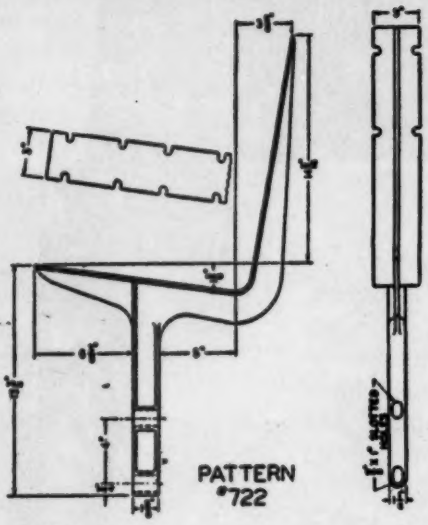
Stadium Grandstand and Gymnasium Balcony Seating



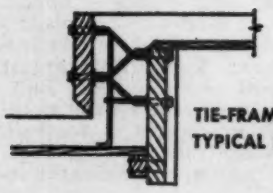
SPECIFICATIONS

Seat Bracket and Seat Bracket Anchorage details shown on the areas, and the relation of these drawings are to be used as a guide only. Seat Brackets shall conform in every dimension that affects posture position, body supporting areas to the concrete treads and risers; and they shall support a static load of 1000 pounds applied through any seat plank (and a 500 pound static load applied through back-rest plank). Seat Bracket anchorages shall support the load described above when embedded in 2000 pound concrete. (see Typical Specification below)

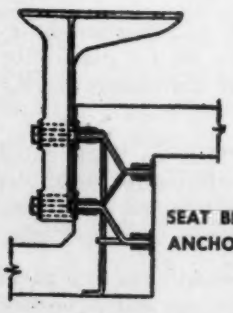
Seat Brackets are available in Malleable Iron and (or) Grey Iron. If Hot-Dipped galvanized Seat Bracket is desired we recommend that Grey Iron Seat Bracket be specified.

TYPICAL SPECIFICATION

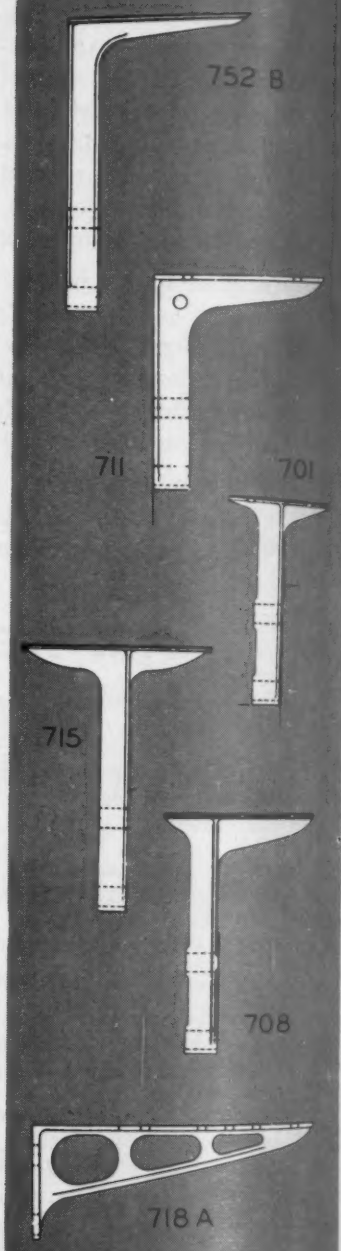
Seat Bracket Pattern No. ..... as manufactured by Hohmann & Barnard of Alabama, Inc., Birmingham 4, Alabama, and Woodside 77, New York, and Tie-Frame Anchorage as Manufactured by Hohmann & Barnard of Ala., Inc.



TIE-FRAME FOR TYPICAL RISER FORM



SEAT BRACKET ANCHORED TO TIE-FRAME



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HUSSEY CLOSED DECK "ROLL-OUTS" ARE SAFER. There are no openings through which spectators can fall or drop things. Fire hazards are reduced because litter cannot collect under the stands. Their extra safety features justify lower over-all public liability insurance rates.

HUSSEY CLOSED DECK "ROLL-OUTS" ARE MORE COMFORTABLE. Leg room is scientifically designed for maximum relaxation. Women, especially, feel more at ease in closed deck seats. Hussey's full 16¼" footboard insures that every size foot rests entirely on a solid base with room to spare. There's ample toe room.

HUSSEY CLOSED DECK "ROLL-OUTS" CUT JANITORIAL COSTS. By actual test Hussey closed deck seats can be swept 25% faster. Seats can be closed immediately because there is no trash on the floor to jam the wheels.

Closed Deck Seating is an exclusive Hussey feature and is available for new and old construction.

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FOOTBALL SCOREBOARDS

The most popular football scoreboards in America. Priced delivered and installed. Super accurate timing, "color keyed" round style numerals for easier reading, lifetime all aluminum weather proof construction, and attractive baked wrinkle enamel finish. The N-400-IV features the famous "Instant-Vue" timing powered with a synchronous motor and designed so it cannot skip minutes or seconds. Available also in the N-400-D with dial timer.

MODEL N-400 IV

ALL NADEN SCOREBOARDS ARE GUARANTEED FOR TWO YEARS

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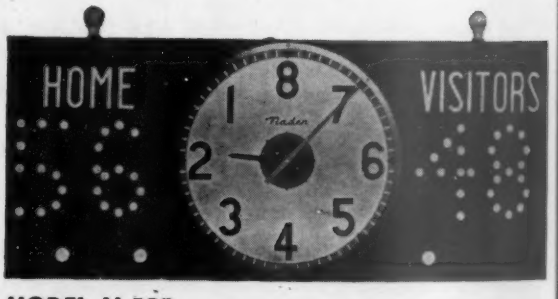
BASKETBALL SCOREBOARDS

There is a Naden basketball scoreboard engineered for your gym or field house. Two and four sided styles as well as synchronized models are available. Foremost among these models is the N-595 featuring Naden "Instant-Vue" timing and score numerals for faster, easier reading. Automatic reset, signal lights, and vibratory horn standard. Louder resonating horn available at additional charge. A truly deluxe scoreboard—a welcome addition to any gym.

MODEL N-595

MODEL N-525

Lowest priced completely automatic scoreboard on the market. Simple design gives the utmost in dependability. Such deluxe features as automatic stop and vibratory horn standard. Heavy gauge steel cabinet with baked enamel finish. Available in 8, 10, or 20 minute periods. Ideal for small gyms, Y.M.C.A., etc.



MODEL N-555

Big scoreboard features at a small scoreboard price make this the value leader in the scoreboard field. 12-½ inch score numerals, automatic reset, automatic stop and horn, large dial timer, aluminum cabinet and baked enamel finish. Shipped ready to operate after simple installation. Available in 8, 10, or 20 minute period.

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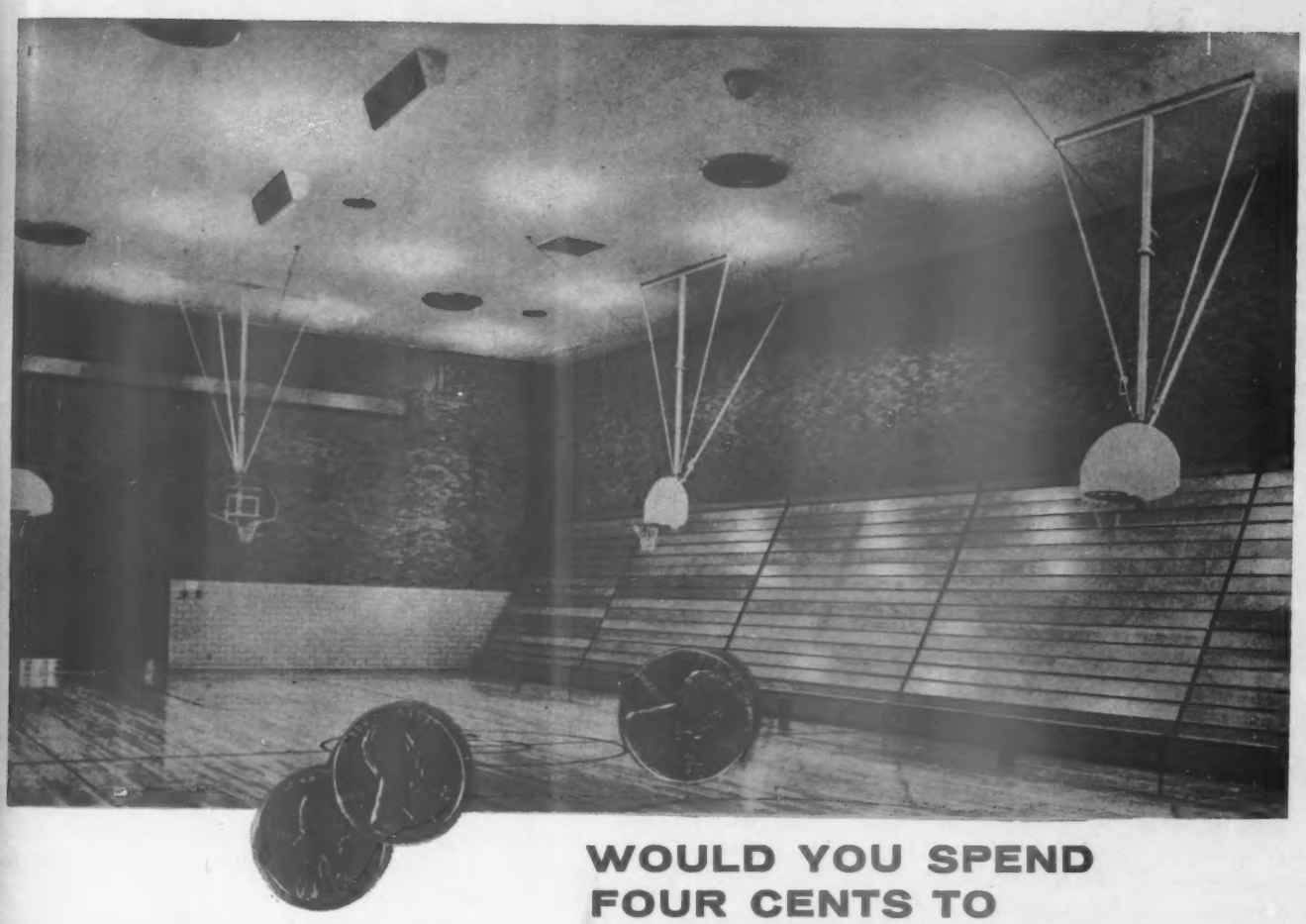

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With just a four cent stamp you can save thousands of dollars in total building costs by sending for Universal's free "gymnasium seating calculator". This simple calculator can help you properly plan your gym seating needs in order to reduce ceiling height to a practical minimum for big savings in both building and heating costs. Ideal for planning remodeling programs, too. Send for your seating calculator today. No cost or obligation, of course.

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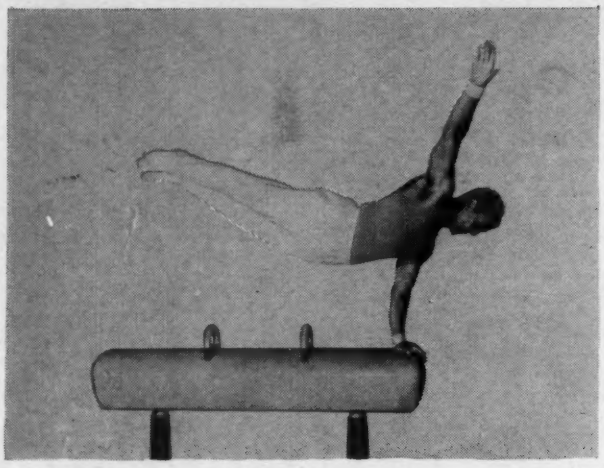
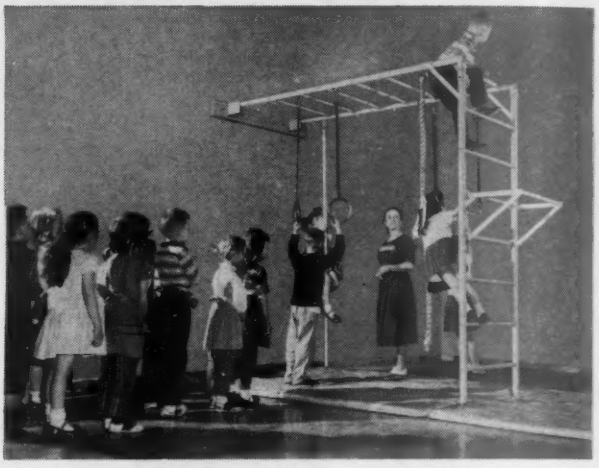
WORLD'S LARGEST MANUFACTURER OF GYMNASIUM APPARATUS



GYMNASIUM APPARATUS— Quality gymnastic apparatus, physical conditioning and anthropometric equipment, game standards and gym mats.



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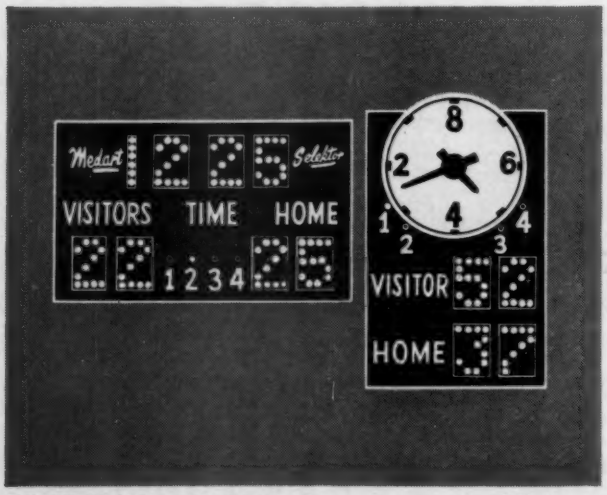
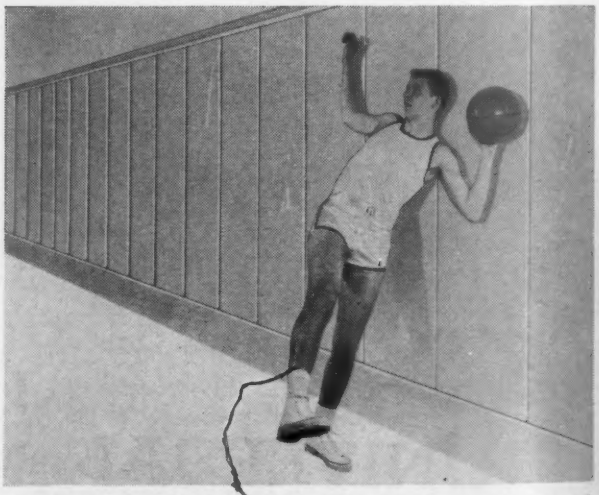


BASKETBALL SCOREBOARDS— Famous Selektor® Brand scoreboards — accurate, fast and absolutely dependable.



SAFE-WAL— Cushioned wainscot for gyms and multi-purpose rooms. Absorbs and dissipates body impact.

Excellence of design, materials and craftsmanship has been a Nissen MEDART tradition. So has the satisfactory solution of all problems concerning the planning and equipping of gymnasiums. This unequalled background of experience is available to you without obligation. Whatever your requirements, consult Nissen MEDART.

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TELESCOPING GYM SEATS

OPERATION ... few moving parts and minimum metal against metal friction permit operating Safway Telescoping Gym Seats with the least amount of effort. Extra large wheels, straight line tracking and nylon glides at each point of metal contact help achieve this ease of operation.

SAFETY ... Eight structural steel columns under each row and extensive steel bracing give Safway gym seats rugged dependability. Three separate exclusive safety devices insure complete reliability under all operating conditions.

APPEARANCE ... Specially compounded sealer and high gloss varnish on seat and foot boards give Safway's vertical cabinet the finished appearance of fine wood paneling.

COMFORT ... Extra wide top seat, spacious toe and heel room and inclined seats are some of the Safway features promoting spectator comfort. Choice of seat spacing dimensions lets you plan for your specific gymnasium requirements.

MULTIPLE USE ... One or any number of rows can be locked open as required, for partial seating capacity for such gym activities as social affairs, chalk talks and lectures. Hydraulically raised movable gym seats are also available.

FLOOR PROTECTION ... Non-marking wheels prevent scuffs and scratches and the wheels roll in adjacent paths to prevent grooving the floor. At no time does bare metal touch the floor. Floating floors are free to expand or contract without hinderance.

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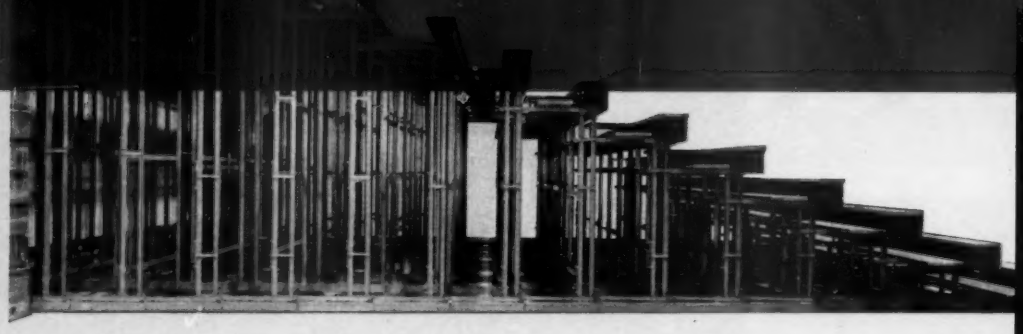
SAFWAY

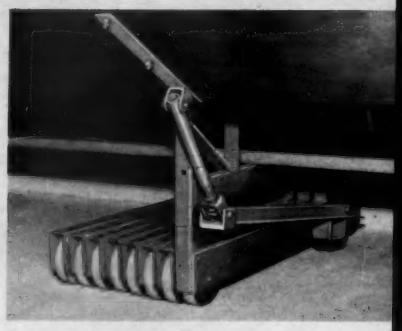
TELESCOPING GYM SEATS

construction details



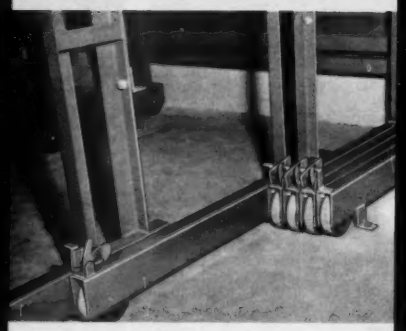
CLOSED CABINET . . . From three to twenty rows, Safway gym seats telescope into a self-contained cabinet just 3-feet deep. When nested, the cabinet face is completely vertical, eliminating projections that might injure players running close to the wall.

LOCKING MECHANISM



BRAKE RELEASED . . . With the first row apron board raised, the brake pad is raised from the floor, allowing the section to be moved in or out. (Note: 4 brake pads per full section).

BRAKE SET . . . With the apron board in the closed position, the brake pads are forced into contact with the floor, locking the section in any position. The apron board is equipped with a key operated cylinder lock, securing the apron boards, preventing unauthorized operation. (All locks are keyed alike).



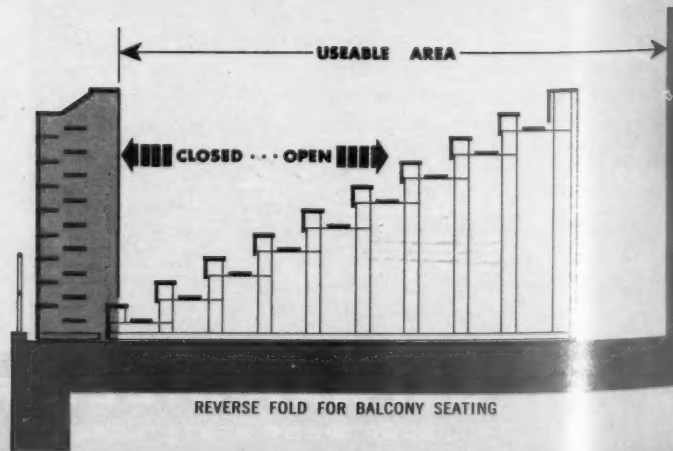
ROW LOCKS ENGAGED . . . As each row is extended individually, the row lock at the front of each wheel carriage engages the lock bar on the adjacent wheel carriage ahead. Each row is locked to the adjacent row in this manner, preventing any movement between rows. Any rearward movement, therefore, would require movement of the entire section.

ROW LOCKS RELEASED . . . As the section is closed, the rearmost moving row takes its nested position. The projecting bar from the nested row trips the row lock, allowing the next row to move into its nested position. This process is repeated for all succeeding rows until the section is fully closed. Release of each row lock is automatic, providing a **smooth successive closing action** of individual rows. Since all rows are locked together, the section moves rearward as a unit, eliminating all binding and assuring a uniform closing action.

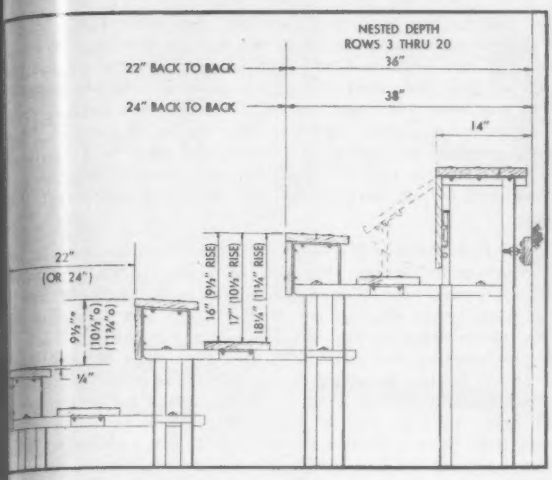
REVERSE FOLD FOR BALCONY SEATING

Safway reverse fold gym seats offer the maximum advantages in dual purpose balcony use. When Safway seating is in a closed position at the balcony line, useable space is made available for varied group activities.

In this closed position, the seating serves as a partition wall, separating the balcony area from the gymnasium.



REVERSE FOLD FOR BALCONY SEATING



COMFORTABLE SEATING

Depending upon your needs, you may select the best combination of seating dimensions from the diagram above.

Each seat area has comfortably wide leg room with additional space for toe and heel movement. Each seat board slopes slightly to the rear to help spectators achieve their own best balance. And every seat is usable — even the top seats against the wall. Safway provides an extra wide top seat board for sufficient back room.

L-1/Sa

The exclusive strength, safety and comfort features described have been developed for the utmost in safety and reliability under all operating conditions. With the well-being of your spectators at stake, Safway has spared nothing in the design and fabrication of quality gymnasium seating. Safway Telescoping Gym Seats will give you many years of safe, trouble-free service.

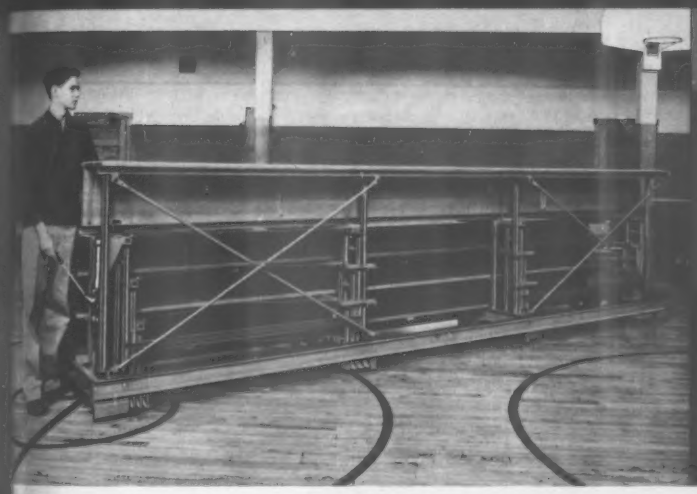
Superior strength and operating ease are built into every Safway Telescoping Gym Seat installation. Vertically, eight steel columns, welded into pairs, support each row of a standard section. Two large wheels under each column (eight wheels under each row) ride in the industry's longest wheel carriage for extra stability. By inter-locking the carriages, the wheels are locked in place under the columns transferring spectator loads directly to the floor. Each rubber wheel is non-marking and equipped with self-lubricating bearings.

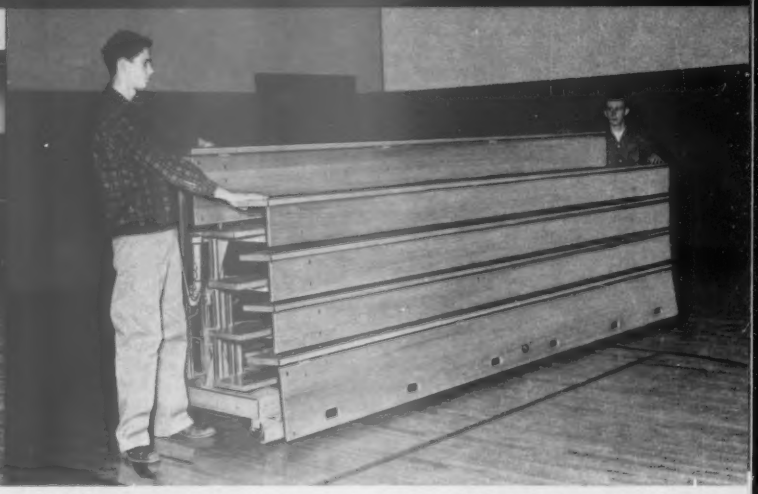
Each row is braced against side sway by angle braces in the vertical plane. The vertical braces are extra efficient through wide spaced bolting to the columns.

Because all rows are interlocked, shock loads are evenly distributed throughout the entire structure. There are no critical parts subject to undue wear.

Safway's exclusive design incorporates a minimum of moving parts, reducing friction, drag and parts subject to malfunction. Nylon glides insure smooth movement.

From start to finish, every function of Safway Telescoping Gym Seats is designed and built for optimum capability. Every part is quality controlled. Every assembly is subjected to rigid performance testing. And, most important, every installation is guaranteed to meet all your requirements where it counts most — in your gymnasium.





MOVABLE SEATS . . . Safway movable gym seats are ideal for auxiliary seating capacity or for relocating seating capacity for smaller spectator events . When in the nested position, the 3-foot wide movable sections can be arranged as a temporary room divider.

Each movable section is equipped with a built-in hydraulic unit that will lift the section off the floor onto extra large rubber wheels. The free-swiveling wheels permit moving the gym seats to any desired location. Releasing the hydraulic lever lowers the section to the floor leaving the gym seats ready for normal use. There are no separate dollies, trucks or other equipment that may be misplaced, lost or require special storage.

Safway movable gym seats, available 3 to 10 rows high, are similar to Wall-Attached sections with additional understructure support for the hydraulic lifting mechanism.

AISLE STEPS . . . Where desired, 36-inch by 12-inch aisle steps between seat and riser boards can be provided without alteration of seating construction. Aisle steps can be readily removed or relocated for additional seating capacity.

FOR MORE DETAILED INFORMATION ABOUT
SAFWAY GYM SEATS AND
ENGINEERING AND PLANNING SERVICE
WRITE

SAFWAY STEEL PRODUCTS, INC.
6228 W. State Street • Milwaukee 13, Wis.

SAFWAY SPECIFICATIONS

SCOPE Furnish and install under factory trained supervision, Safway Telescoping Gym Seats as manufactured by Safway Steel Products, Inc., Milwaukee, Wisconsin, or approved equal, in accordance with plans as follows:

.....Group(s) .....feet long .....rows high

.....Group(s) .....feet long .....rows high

(Note: A group is any number of sections required for a given length of wall.) Entire installation shall be guaranteed for one year against faulty materials or workmanship.

OPERATION Gym seats shall operate on the telescoping principle and all columns, or foot and seat supports, shall roll on 4-inch by 1-inch flat faced self-lubricating rubber wheels. When closed, the front of the gym seats will present a flush vertical surface. Each row shall automatically and positively lock in relation to the adjacent rows as the gym seats are opened. Any number of rows may be pulled out and locked open by means of a friction brake operating against the floor and actuated by closing the front riser board. The gym seats shall be positively locked in the open or closed position by means of a cylinder lock mounted on the front riser board.

DESIGN (1) Gym seats shall support, in addition to their own weight, a uniformly distributed live load of not less than 100 pounds per square foot of gross horizontal projection. All seat and foot board members shall be designed for live loads of not less than 120 pounds per linear foot. Gym seats shall resist a horizontal sway force applied to the seats in a direction parallel to their length of 24 pounds per linear foot.

(2) Maximum height, open or closed, shall be .....
Maximum extended depth shall be .....
Nested depth for all rows, 3 to 20, shall be 36-inches for 22-inch back to back seat spacing, and 38-inches for 24-inch back to back seat spacing.
On wall-attached gym seats, this distance shall include a top row seat depth of 14-inches to provide as much seating comfort on the top row as on every other row.

(3) Each row shall have a depth of not less than 22-inches back to back of seat boards and a rise between rows of 10½-inches with a distance of 17-inches from seat to foot board. (A row depth of 24-inches back to back of seat boards and a 9½-inch rise with 16-inches from seat to foot board, or an 11¾-inch rise with 18¼-inches from seat to foot board may also be specified.) Horizontal toe room shall be at least 6-inches beyond foot board, and heel room shall be at least 3-inches behind foot board.

CONSTRUCTION All framework shall be of high quality rolled structural steel angles electrically welded during fabrication into the largest components that can be conveniently handled in the field. Bolted field connections will be held to a minimum. Standard sections shall be as near 16-feet in length as conditions permit. Each row of a standard section shall be supported by not less than 8 rolled structural steel angles welded into pairs to form rigid columns. Angle bracing between columns shall be adequate in size and so located that the all steel welded structure shall be entirely self-supporting before addition of wooden members. Each row shall have sets of angle braces. Each column shall be supported by two bronze bushed self-oiling 4-inch by 1-inch flat faced rubber wheels completely enclosed in a metal carriage. Metal against metal friction shall be reduced to a minimum by means of nylon glides located at the front and rear of the wheel carriages and at the top of the seat columns to permit maximum ease of operation. Gravity operated latches attached to the wheel carriages at the base of columns shall positively lock each row out with respect to each adjacent row. Each section of gym seats shall also be equipped with friction type locks operated by the front riser board which will permit any desired number of rows to be locked open. Keyed alike cylinder locks shall prevent unauthorized opening or closing. All permanent units shall be secured to the wall and floor in such a manner that expansion or contraction of the floor will not in any way disturb the stability or alignment of the gym seats.

WOODEN MEMBERS Seat and foot boards shall be solid industrial clear grade Douglas Fir with eased edges, finished 1-1/16 inches by 9¼-inches. The hinged basketball deflector board shall be edge glued clear grade Douglas Fir. Bottom apron board shall be edge glued clear grade Douglas Fir, hinged, reinforced and provided with hand holes for opening and closing the gym seats. A prop support shall hold this apron board, permitting easy access beneath the gym seats for cleaning. All riser boards shall be edge glued clear grade Douglas Fir, 25/32-inches by 7¼, 8¼ or 9½-inches. When closed, risers and seat boards shall form a vertical cabinet. Steel offset doweling is provided on ends of seat and foot boards to prevent end splitting. Laminated seat and foot boards optional.

FINISH All steel parts shall be finished with Gray baked-on enamel. Wood parts shall be factory finished on all exposed surfaces, primer coated with an Epon base finish, and hot sprayed with a final finish coat of a Golden Oak Phenolic varnish, control-dried to a tough wear resistant hard coating. Completed wood shall be full bodied with protective coating of high lustre hard wax.

MOVABLE GYM SEAT SECTIONS Movable gym seat sections, up to ten rows high, shall be constructed to permit rolling the closed sections from area to area. Each movable section shall be raised onto oversized free-turning swivel casters for easy movement. When opened, the sections shall have the same stable characteristics as wall attached sections.

ACCESSORIES The following accessories shall be furnished as requested:

GUARD RAILS Cadmium plated guard rails of not less than 1⅜-inches O.D. steel tubing shall be installed on the open ends of all gym seats.

END PANELS End panels shall be installed on all exposed ends of wall-attached gym seats.

AISLE STEPS Aisle steps 36-inches long and 12-inches wide shall be provided at seat level between seat boards and risers to effect a vertical aisle.

REMOVABLE SEAT AND FOOT BOARDS Removable seat and foot boards shall be provided, as required, for additional seating capacity between sections which must be kept separated because of doors, partitions, pilasters, etc.

SCORER'S TABLE A scorer's table with a tilted 8-foot by 16-inch plywood top and having a retaining lip on the lower edge shall be provided. No bolts shall be required for assembly.

NOTE: *Nothing above shall prohibit Safway from offering latest design innovations.*

TABLE OF DIMENSIONS AND CAPACITIES OF ONE STANDARD 16' SECTION

No. Rows	Capacity at 16" Per Seat	NESTED DEPTH* 22" B-B	NESTED DEPTH* 24" B-B	EXTENDED DEPTH* 22" B-B	EXTENDED DEPTH* 24" B-B	HEIGHT TOP SEAT 9½" Rise	HEIGHT TOP SEAT 10½" Rise	HEIGHT TOP SEAT 11¾" Rise
3	36	3'-0"	3'-2"	4'-10"	5'-2"	2'-11"	3'-2"	3'-4½"
4	48	3'-0"	3'-2"	6'-8"	7'-2"	3'-8½"	4'-½"	4'-4¼"
5	60	3'-0"	3'-2"	8'-6"	9'-2"	4'-6"	4'-11"	5'-4"
6	72	3'-0"	3'-2"	10'-4"	11'-2"	5'-3½"	5'-9½"	6'-3¾"
7	84	3'-0"	3'-2"	12'-2"	13'-2"	6'-1"	6'-8"	7'-3½"
8	96	3'-0"	3'-2"	14'-0"	15'-2"	6'-10½"	7'-6½"	8'-3¼"
9	108	3'-0"	3'-2"	15'-10"	17'-2"	7'-8"	8'-5"	9'-3"
10	120	3'-0"	3'-2"	17'-8"	19'-2"	8'-5½"	9'-3½"	10'-2¾"
11	132	3'-0"	3'-2"	19'-6"	21'-2"	9'-3"	10'-2"	11'-2½"
12	144	3'-0"	3'-2"	21'-4"	23'-2"	10'-½"	11'-½"	12'-2¼"
13	156	3'-0"	3'-2"	23'-2"	25'-2"	10'-10"	11'-11"	13'-2"
14	168	3'-0"	3'-2"	25'-0"	27'-2"	11'-7½"	12'-9½"	14'-1¾"
15	180	3'-0"	3'-2"	26'-10"	29'-2"	12'-5"	13'-8"	15'-1½"
16	192	3'-0"	3'-2"	28'-8"	31'-2"	13'-2½"	14'-6½"	16'-1¼"
17	204	3'-0"	3'-3"	30'-6"	33'-2"	14'-0"	15'-5"	17'-1"
18	216	3'-0"	3'-2"	32'-4"	35'-2"	14'-9½"	16'-3½"	18'-½"
19[A]	—	3'-0"	3'-2"	34'-2"	37'-2"	15'-7"	17'-2"	19'-½"
20[A]	—	3'-0"	3'-2"	36'-0"	39'-2"	16'-4½"	18'-1½"	20'-½"

*Extended and nested depths shown above provide a top seat of approximately 14" to assure the same comfort for top row seats as on all others. Information for capacities and dimensions for higher rows than 18 available upon request.

[A]19 and 20-row sections available in 18' to 20' lengths only.

SAFWAY STEEL PRODUCTS, INC.
6228 WEST STATE STREET • MILWAUKEE 13, WIS.

NISSEN TRAMPOLINE®

BOUNCING EQUIPMENT

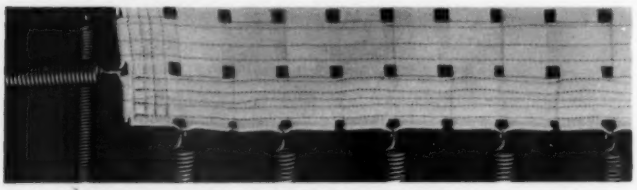
SCHOOL CATALOG 161

Whether you are a physical education instructor looking for top-notch performance and safety or a school administrator or business manager interested in the best buy, the following information is presented to help you make a wise choice in rebound tumbling equipment.

CHOOSING REBOUND TUMBLING EQUIPMENT

Your selection of a rebound tumbling unit should be approached with considerable care. The choice will depend on the particular grade level of the students and the kind of teaching program that is to be implemented. For beginning programs at the elementary and junior high level, the 7′ x 12′ size Little Giant provides dependable bouncing at relatively low cost. In high school programs, or where more advanced work is anticipated, the 9′ x 15′ size Regulation model is the answer. For the ultimate performance at any grade level, the larger size Goliath model provides everything that could be desired for class use, exhibitions, and competition.

BOUNCING BEDS AND SUSPENSION SYSTEMS



Top quality materials and fabrication are vital to good, lasting performance. What other companies only *claim* about their bouncing beds, Nissen has *proven* in over 10,000 schools during the last twenty-five years. Each improvement in either design or material has been thoroughly tested *before* being released to our customers.

The type of bed you select is important, as they differ in performance as well as in price. Web beds (illustrated) are more popular with students because their construction results in a more efficient lift. Solid type beds are more advisable in situations where the budget has to be considered.

BUY PROVEN FRAME DESIGN

Obviously, well-designed equipment lasts longer and performs better than equipment of ordinary design. Nissen has designed and manufactured rebound tumbling equipment for over twenty-five years and its wealth of engineering knowledge in this field is unmatched. Over 10,000 schools, colleges, YMCA's, and camps have Nissen Trampoline® equipment . . . thousands more than all other manufacturers *combined*.

What makes Nissen equipment so desirable for school use? It is performance that determines how popular and how well-known a certain brand becomes. Performance that comes from basic design features only Nissen can offer. Design that has been proven again and again is important in the day-to-day use of rebound tumbling equipment. Design that means easy folding and handling, not only each day the equipment is used, but design that will mean years of trouble-free service. Nissen's exclusive "Flashfold" feature (see below) is an example. Folding can be accomplished easily by one person in less than a minute. Since the lightweight end sections fold independently of the legs, the Trampoline unit may be left in a *"half-fold"* position (see below) when it is not in use.

The oval-shaped steel tubing used in the construction of the frame is another Nissen exclusive. Not only is it stronger than round tubing, but its lighter weight makes folding much easier. Should any major part be damaged, Nissen's exclusive fabrication techniques allow replacement *at your school,* using simple hand tools.

HOW ABOUT FRAME PADS?

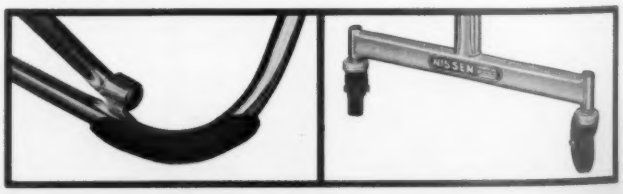
Frame pads are recomended for all our models. They provide an added measure of safety at very little additional cost. Nissen frame pads are made from a vinyl foam which is the safest, most shock absorbing material that can be produced. This material is covered with a heavy grade of washable vinyl that helps keep the pads flat and neat. For attachment to the frame, spring steel clips coated with vinyl rubber are used that hold pads firmly in place.

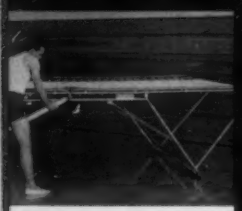
IS CHROME PLATING IMPORTANT?

Chrome plating *is* important to those of us who appreciate equipment that requires little or no maintenance year after year. Heavy, high quality nickel chrome plating not only assures a minimum of maintenance, but also provides an exceptionally attractive "dressed-up" touch to the gymnasium. Chrome retains its sparkling new appearance without marring or chipping. Nissen chrome plated equipment costs *no more* than ordinary painted equipment.

IMPORTANT EXTRAS

With Nissen you can expect many quality features included as standard equipment — The blue rubber floor protectors prevent shifting and provide a colorful highlight for the bright chrome frame. These are detachable and can be replaced if necessary — Individual anchor loops are permanently fused to the frame directly opposite loops on the bed, providing a straight pull on the suspension system — Roller stands are constructed of strong oval-shaped tubing and chrome plated. — Large, heavy-duty casters allow easy, roll-away storage — Large flush hinges are drop-forged to provide the most dependable operation possible. This is traditional Nissen quality at its finest.

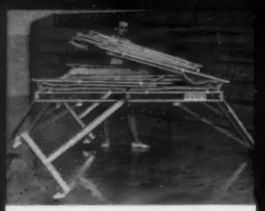




1 Insert roller stands.

2 Next, kick out end braces at bottom.

3 Lift and fold end section.



4 Kick other end braces at bottom. Fold end section so equipment is in "half-fold" position.

5 At the end just folded, lift unit so roller stands swing into upright position. Push forward, keeping pressure on opposite legs.

6 Pick up and fold leg. For the same applies in der.

NISSEN Regulation

(Frame: 9′ x 15′; Bed: 6′ x 12′)

BOUNCING BED

Woven with 1¾" wide nylon webbing, this bed provides the ultimate in bouncing for schools and colleges. Specified for official competition. Multi-stitched with treated nylon thread under tension. Red center marker is woven into webbing for permanent identification. Extra reinforcement around edges of bed. Proven in thousands of schools throughout the country. Also available with 1" webbing and in solid nylon or cotton canvas.

SUSPENSION SYSTEM

Strong 12" rubber cables, doubled, with eye hooks for easy connection. Provide a soft, effortless bounce and are recommended for use with nylon web beds. Plated steel springs may be ordered in lieu of cables.

FRAME

Proven design for years of trouble-free performance. Use of oval-shaped steel tubing adds strength and rigidity to frame, yet is lighter in weight than most round tubing. This is especially important in folding or unfolding. Heavy-duty roller stands are included with Regulation and Goliath models. Individual anchor loops are permanently fused to frame directly opposite loops on the bed. And it's CHROME PLATED at no extra cost.

LEGS

The use of two leg sections of "U" shaped design with end brace supports has proven to be the most satisfactory because they provide rigidity to the side of the frame where it is needed. Detachable blue rubber floor protectors prevent shifting.

The Regulation model is built with traditional Nissen ruggedness to take years of continuous use. This same ruggedness can be found in the Goliath model which is identical in design but has a larger bed area for the utmost in performance. The Goliath is becoming more and more popular for schools, colleges, YMCA's, camps, and recreation centers. Frame measures 10′ x 17′ with a performing area of 7′ x 14′.

SPECIFICATIONS

NO.	DESCRIPTION	WEIGHT	SCHOOL PRICE
R163	Regulation with cotton canvas bed and plated springs (set of 100)	407 lbs.	$395
R162	Regulation with nylon canvas bed and plated springs (set of 100)*	390 lbs.	$427
R161	Regulation with 1¾" nylon web bed and rubber cables (set of 100)	360 lbs.	$539
R164	Frame Pads (set of 6)	23 lbs.	$ 66
	*Available with rubber cables $44.00 additional		

NISSEN

Little Giant

for

Elementary and Junior High Schools

Perfect for elementary, junior high school and beginning physical education programs. Easily set up outdoors, in the gym or on the stage. Detachable blue rubber floor protectors prevent shifting. Choice of top-performing bouncing beds and either plated springs or rubber cable suspension system. Lifetime chrome finish will retain its attractive appearance. Exclusive "Flashfold" feature allows instant folding. (Frame: 7′ x 12′, Bed: 5′ x 10′)

SPECIFICATIONS

NO.	DESCRIPTION	WEIGHT	SCHOOL PRICE
L35	Little Giant with cotton canvas bed and plated springs (set of 78)	246 lbs.	$280
L36	Little Giant with nylon canvas bed and plated springs (set of 78)	236 lbs.	$280
L37	Little Giant with nylon web bed and plated springs (set of 78)	244 lbs.	$330
L38	Frame Pads (set of 6)	14 lbs.	$ 54

INSTRUCTIONAL AIDS

TRAINING MANUAL

A thorough guide to developing rebound tumbling in any school P. E. program. Fully illustrated to help instructor visualize each stunt.

TRAINING FILM

Actual instruction and training scenes with full narration, 16MM, 12 minute running time. Rental free to Goliath, Regulation or Little Giant owners.

INSTRUCTIONAL WALL CHARTS

Illustrated wall charts show elementary and advanced stunts. Teaching guide included.

PARTS LIST

	WEIGHT	SCHO PRI
REGULATION		
Nylon Web Bed (1¾" webbing)	30 lbs.	$188
Nylon Canvas Bed	18 lbs.	$120
Cotton Canvas Bed	35 lbs.	$ 88
Rubber Cables (set of 100)	23 lbs.	$ 77
Plated Steel Springs 9" (set of 100)	65 lbs.	$ 33
LITTLE GIANT		
Nylon Web Bed (1¾" webbing)	18 lbs.	$125
Nylon Canvas Bed	10 lbs.	$ 75
Cotton Canvas Bed	22 lbs.	$ 75
Rubber Cables (set of 78)	14 lbs.	$ 56
Plated Steel Springs 9" (set of 78)	49 lbs.	$ 25
Roller Stands (optional with L. G.)	21 lbs.	$ 30

NISSEN TRAMPOLINE COMPANY, CEDAR RAPIDS, IOWA, U.S.A

M MAINTENANCE EQUIPMENT AND SUPPLIES

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ADVERTISING

Vacuum Cleaners, Scrubbing Machines

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Finnell System, Inc.	M 9
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Hild Floor Machine Company, Inc.	M-1/Hi
Holt Manufacturing Co.	M 11
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United Floor Machine Company, Inc.	M 15

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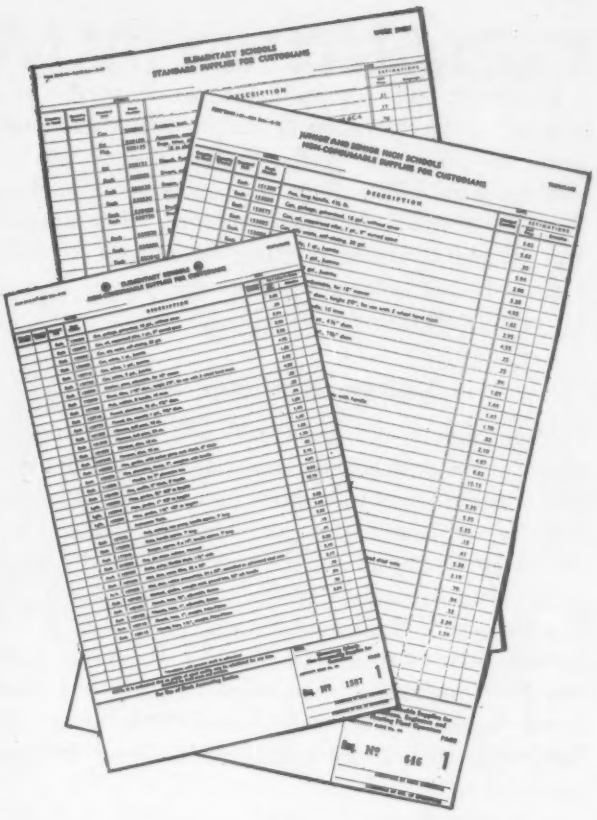


Custodial and Maintenance Supply Systems

by J. W. Schaefer

Maintenance and Operations Manager, Los Angeles, California, City Schools

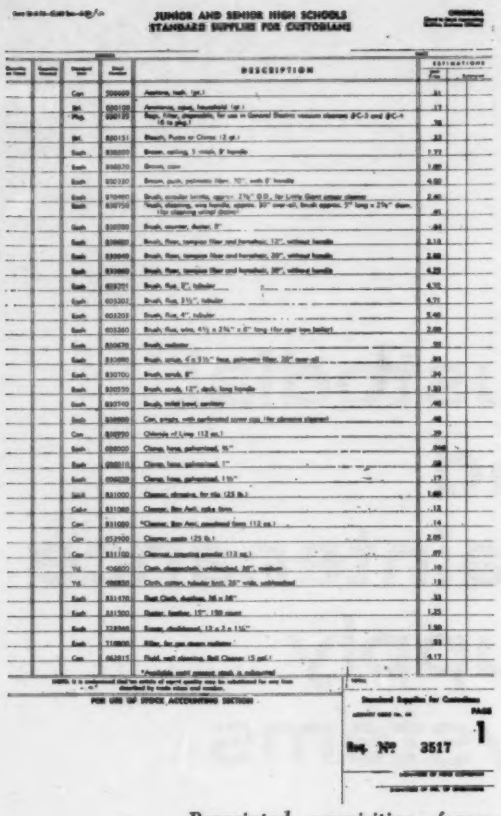
Mr. Schaefer is a life-long resident of California. He was educated in the Los Angeles City Schools and has served the system in a number of capacities since 1929. He has been maintenance and operations manager since 1956.

IN A DISTRICT as large as the Los Angeles City School System the custodial (operations) and maintenance divisions are almost separate entities. Both divisions are administered by the maintenance and operations branch of the Business Division but have completely different methods and and procedures for requisitioning supplies and materials. Through the years each division has developed a supply system that works well, is subject to regular revision for improvement and which is carried out by trained personnel. An examination of how the systems work may have implications for other school districts, large or small.

In operations, concern is with the supplies and equipment needed for the day to day cleaning, sweeping, and dusting tasks performed by the custodial staff. Regular crews do this work, but specialized teams from a central shop periodically wash windows and walls in the secondary schools. The regular custodians on duty wash windows in the elementary schools. During summer vacations floors are stripped of worn protective coatings and new materials are applied, sometimes by the school custodial staff, at others by specialized crews. Polymer-type floor dressings are now used instead of water wax. Heating engineers are supervised by the operations division and order their supplies in the same manner as the custodians.

Requisition Forms

Preprinted requisitions are provided at all schools to simplify the ordering of standard supplies, light globes and fuses, paper towels, sanitary and non-consumable supplies. Items are listed alphabetically on the forms. To develop these standard lists periodic meetings are held with members of the supplies and equipment division. Head custodians also participate in the sessions. The committee reviews the standard lists, eliminates or adds items and


JUNIOR AND SENIOR HIGH SCHOOLS
STANDARD SUPPLIES FOR CUSTODIANS

DESCRIPTION

Standard Supplies for Custodians

Req. № 3517

1

Preprinted requisition forms used in Los Angeles Schools simplify ordering.

revises specifications where necessary. The committee meets annually to consider one of the three major classifications. Each section of the requisition is thus reviewed at three year intervals. The approved lists are kept up-to-date and suggestions are made for newly developed items which could reduce costs or improve service.

Detailed specifications have been developed for practically all items listed on the requisitions. These are given to the purchasing department for their guidance in establishing contracts and purchase orders. Purchasing buys these supplies through procedures required by the California Education Code. The code limits the size of purchase orders made without benefit of advertising to one thousand dollars. However, it is the actual policy of the purchasing department to advertise all non-emergency purchases over five hundred dollars. Most items are purchased in large quantities to effect the best possible savings to the district.

In many instances the operations division is requested by purchasing to make practical tests on soaps, detergents, polishes, floor dressing, etc. to determine acceptable products. Tests are made on materials from unmarked containers to avoid any possibility of prejudice affecting the results.

Practically all supply items are carried in a general stores warehouse. Requisitions for these items are processed by the head custodian and go to the central office of the operations section. Here they are checked for reasonableness of quantities and are sent to the accounting department for fund approval and billing, then to the stores branch for filling and delivery to the school.

Maintenance Supplies

Maintenance, with the task of keeping school plants in proper repair, has a somewhat different problem in ordering supplies and materials. In Los Angeles, a "spread-out metropolis," it has been necessary to establish maintenance areas in seven geographical locations of the school district. There is a branch of the general stores in each area and all are supervised by the director of stores. Each branch maintains a supply of frequently needed items—lumber, pipe and pipe fittings, nails and hardware, roofing materials, paints, floor finishes, etc.

The director of stores is responsible for maintaining a workable level of materials in the areas. He orders supplies through the purchasing branch, in quantity whenever possible to get the best possible price with the least number of purchases.

Repairs on furniture, office machines, radio and television equipment, locks, electric motors, refrigeration equipment, and many other items are made at a large central shop. A general maintenance store is located here and operates as a stockpile for hard to get items. Some parts require several months for delivery and are needed frequently enough to warrant storing for future use.

Non-stock maintenance materials are difficult to standardize. We have made studies in this direction, but there is still much to be done. For instance, at one time we found the seven areas each ordering a different brand of rust preventive paint. After investigation it was found that one standard type would serve all requirements.

The standardization, purchasing, storing and use of operational and maintenance supplies and materials are tasks which require constant surveillance by trained personnel. Hit-or-miss procedures will not work. Too much money is involved in items which, if improperly handled, could be a drain on the taxpayer's dollar.

Maintenance and Operations Bibliography

by Richard F. Tonigan
Plant Manager, Teachers College, Columbia University, N.Y.

Mr. Tonigan has B.S. and M.S. degrees from University of Illinois and is a doctoral candidate at Teachers College, Columbia University. He has been with Teachers College since 1957 and previously was an assistant superintendent for the Arlington County, Va., Schools.

ARTICLES, books and other literary pieces on school plant operation and maintenance now number in the thousands. Plant personnel cannot possibly read every item written about their field and that is why this bibliography has been prepared. By design it is not a complete compilation of all writings about plant maintenance and operations. Instead, the listing gives each reader a selection of material which (1) should interest all school plant leaders, and (2) represents almost all major sources of literature on school plant operations and maintenance. Anyone interested in a specific subject may seek out additional references through the same and related sources.

Many local school plant undertakings are handicapped by insufficient review of what has happened in other places with similar projects. Why do over and over what others have already done, unless some improvement is reached in the process? This reading reference can serve as an informative assist to supervisory development. It is organized under five main headings: general, operations, maintenance, alterations (minor) and administration.

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MODEL	BRUSH DIA. (inches)	MOTOR HP	WEIGHT (lbs.)
12	12	⅓	40
14	14	½	55
14A	14	⅓	50
16	16	¾	100
190	19	1	120
230	23	1½	135
230A	23	1	132

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600	4	½	½
Dual 800	10	1⅔	1
Dual S-800*	10	1⅔	1

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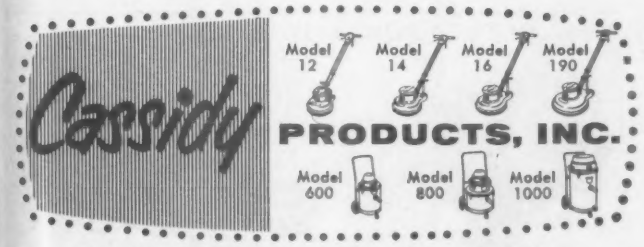

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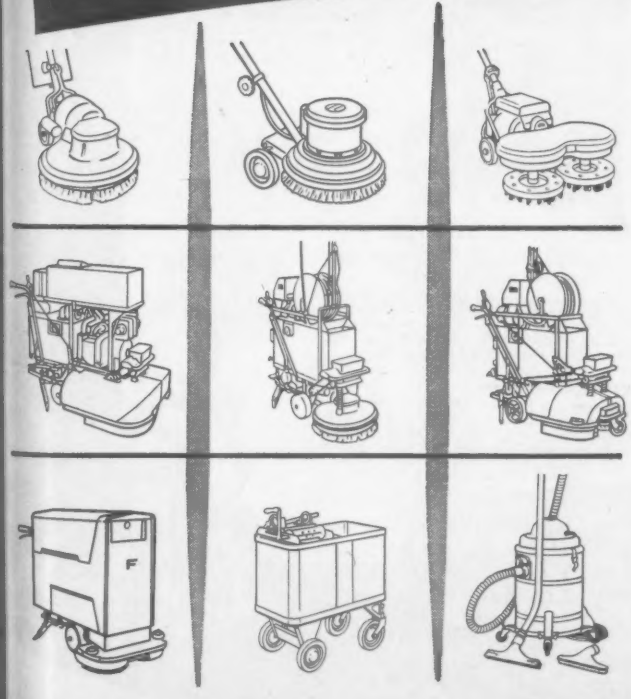

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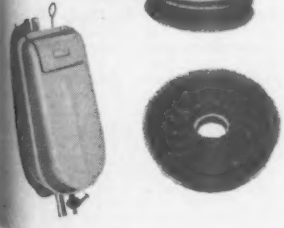

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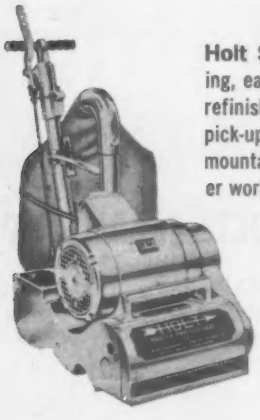
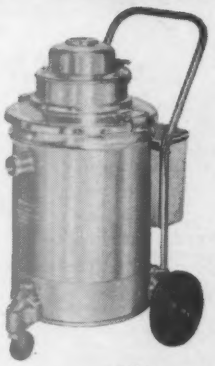
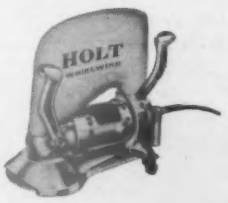


Holt Sanders are smooth operating, easy to handle on either new or refinishing jobs. Dust-free vacuum pick-up. Quick-change, patented demountable drum cushion keeps sander working. 8" and 12" cuts.



Heavy-duty Vacuum. For dry pick-up or wet pick-up after scrubbing or shampooing. Easily converted to blower. Sizes: VA128B and VA125B (shown) with 15-gallon, corrosion-proof tank; VA88B and VA85B, 10-gal.; VA-45B, 6-gal.

For Scrubbing and Shampooing upholstery, small rugs, stairway runners, and hard-to-reach corners, you can't beat Holt Whirlwind Upholstery Scrubber. Positive solution feed—no hand pumping. Controls at brush head start and stop motor, and solution; prevent flooding. 7-gallon tank; weight 70 lbs.



Rotary Edger quickly edges floors, sands stairs, corners, closets, etc. 7" sanding disc.

For floor maintenance equipment that's easy on your budget and easy on operator, buy Holt machines. See your nearest Holt dealer, or write us for descriptive literature and prices.

#38

Sales and Service Centers in Major Cities

HOLT MANUFACTURING CO.
BETTER FLOOR MACHINES FOR MORE THAN 35 YEARS

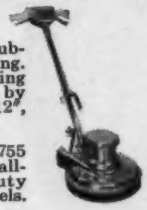
669-20th St., Oakland 12, Calif. • 272 Badger Ave., Newark 8, N.J.
10702-46th St., Tampa 10, Fla.

MULTI-CLEAN PRODUCTS INCORPORATED

Dept. AS-1-1, 2277 Ford Parkway, St. Paul 16, Minn.

MULTI-CLEAN® Method

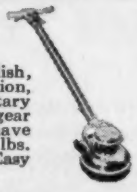
SCRUBBING MACHINE—For floors, rugs and carpets. Heavy gauge plastic tank, easily filled, non-spilling. Fingertip solution flow and dual-purpose safety switch. Balanced construction, adjustable handle. 8 ball bearing gear unit. Capacitor motor with sealed bearings, no brushes. 3-conductor cord. Sizes: 12", 14", 16", 19" and 22". Attachments for every floor maintenance job.



FLOOR MACHINE—For every type floor work . . . scrubbing, waxing, polishing, troweling, grinding, dry cleaning. Same balanced construction and features as Scrubbing Machine. Quickly converted to scrubbing machine by attaching solution tank and controls. Six models: 12", 14", 16", 19", 22", and 31".

MC-31—31" machine with covering area of 755 sq. in. for cleaning, polishing, steel wooling hallways, large unobstructed areas. Heavy-duty construction, operation similar to other models.

EXPLOSION-PROOF FLOOR MACHINE—For mechanical floor maintenance in hazardous areas without danger of fire or explosion. Can be used near and in combustible material with absolute safety. All electrical components are listed by U/L. Brush size: 16". Heavy-duty switch and 40 ft. Neoprene-covered 3-conductor cord.



LITE-12 and LITE-14 FLOOR MACHINES—Scrub, wax, polish, steel wool all types of floors. Low, balanced construction, efficient, rugged. Finger-tip lever-operated momentary contact type switch. Direct ball bearing greaseless gear drive. ¼ hp AC motor, 30' cord. Lite-12 and Lite-14 have 12" and 14" brush diameters; weigh only 38 and 40 lbs. respectively. Plastic bumpers surround base and top. Easy on-off attachments. U/L listed. Solution tank available.

IMPERIAL SERIES VACUUM CLEANERS—Wet and dry pickup. Special motor and turbine design gives powerful pick-up at much lower rpm than most other vacs. Automatic shut-off when tank fills to capacity. ½, 1, and 1½ hp motors available with 7, 12, and 17 gallon tanks. Washable, quick-drying filter won't rot or mildew. Drain valve and plastic bumper on all tanks. Big wheels. Detachable cable.

D-125 VACUUM CLEANER is inexpensive vac with "big vac" performance. ½ hp motor develops 66" water lift. Heavy gauge steel tank holds 1 1/5 bu. dry or 11 gal. liquid material. Big 8" wheels. Welded steel tube handle. 8'x1½" plastic hose.

D-110 VACUUM CLEANER—For dry pickup. Weighs only 29 lbs. ½ hp Universal motor has long life. Precision ball bearings factory-sealed and lubricated. 2-stage turbine has powerful suction, 66" water lift. Sturdy all-welded tank holds ½ bu. dry material. 8' x 1½" flexible hose. All attachments.

F-300 VAC-BLOWER—All-purpose industrial vacuum cleaner and a powerful blower. 16 lb. detachable power head and dust bag for portable blowing or vacuuming. 10-gal. steel tank, 1 hp. AC-DC motor, 43" maximum water lift. Complete unit weighs only 50 lbs. Wet or dry pickup; furnace, boiler, and chimney cleaning; blowing dust from motors, switchboards, electrical equipment.

EXPLOSION-PROOF VACUUM CLEANER U/L listed for safe wet or dry pickup where explosive gases, liquids, or dust are present (Class 1, Group D and Class 2, Group G hazardous locations). ½ hp enclosed motor. 62" water lift. Aluminum tank holds 10 gallons wet or 1½ bushels dry material. Static-free bronze wool filter. Explosion-proof switch. All parts and accessories made of spark-resistant brass or aluminum.

ADD-A-TANK—Adapts any industrial vacuum cleaner for heavy volume pickup. Fits 30-gal. or smaller ash can or drum. For cleaning boiler flues, fire boxes, chimneys, milling machinery, grain elevator pits.

MULTI-CLEAN TESTED AND PROVED FLOOR FINISHES

WATERPROOF WAX — Lasting beauty, longer wear for all type floors. Blend of Carnauba and finest synthetic resins is remarkably *dirt resistant*. Also resists blackmarking, scuffing; won't crack, chip, yellow with age. Available with 12, 15, 18% solids content; also in special anti-slip formula. Listed by U/L.

LIQUID SPIRIT WAX—For sealed surfaces. Cleans and waxes in one operation. Consists of vegetable and mineral waxes reinforced with special resins. Gives hard, flexible, easily-cleaned surface. Adds life and lustre to all floors except asphalt and rubber. Maroon, tile red, brown, green, gray, colorless.

BLUE BLAZES CLEANER with HCP—Concentrated non-ionic synthetic cleaner for all floors. Cleans completely in hard or soft, cold or hot water. Easy rinsing, no soap scum. Cleans with a minimum of scrubbing. Approved by Rubber Mfrs. Ass'n. Meets or exceeds Asphalt Tile Inst. specifications.

STAPH-TROLE ANTISEPTIC CLEANER 200:1 dilution of this powerful antiseptic cleaner destroys *Staphylococcus aureus*, most other bacteria. Special non-ionic detergent's wetting, penetrating action increases germicidal effect. Floors, walls resist recontamination, stay de-odorized because odor-forming bacteria are destroyed. No film or residue. Equally effective in hard or soft, cold or warm water.

DIANTROLE—Phenolic-based antiseptic cleaner effective against gram positive and negative bacteria including *Staphylococcus Aureus* and *Salmonella Typhosa*. Safe on all floors. Leaves no film.

SUPER SAFETY CLEANER with HCP—All purpose, synthetic-base, *anionic* cleaner lifts grime quickly, and holds it in suspension for easy removal. Safe for all floors. Cleans perfectly in hardest water. Dilutes 50 or 60:1 for general cleaning; 12 or 16:1 to remove wax.

LO-FOAM CLEANER—Specially formulated for use with combination scrubber-vacs. Fast detergent action but foam breaks down before reaching vacuum pickup. Leaves no film.

WAX REMOVER — Safe for all floors. Cleans floor and removes wax buildups. Odorless, non-ionic, non-inflammable. Easy, quick, inexpensive to use. Contains powerful emulsifying agent that works in 10 to 15 minutes.

REMOVOIL—A solvent cleaner and degreaser. Makes oil-soaked floors look like new. Non-explosive, non-toxic. Removes rubber burns from gym floors. Degreases metal and alloys. Protects against rust and corrosion. Easy to use, highly concentrated.

SEAL AND VARNISH STRIPPER—Removes finish from wood, concrete, terrazzo. Easy to apply. Lifts old finish in 30 to 40 minutes. Non-inflammable. Won't raise grain in wood or harm basic floor materials.

CONCRETE HARDENER AND ETCHER—Cleans, etches, hardens, dustproofs. Gives extra strength to concrete. Etches all surfaces evenly so seals give more coverage, adhere better, last longer.

NEO-DRY CONCRETE SEALER — (Rubber base). Beautifully colors concrete floor surfaces. Fast drying, easy to apply, prevents dusting and chipping. Highly resistant to alkali and other corrosive agents. Colors: tile red, brown, gray, light gray, green, white, black, natural. Listed by U/L.

CONCRETE PRESERVER—(Bakelite base). Provides tough, sanitary, colorful finish and longer life for new or old concrete. Prevents dusting. High resistance to abrasion, water, grease, oils, alkali and soap. Especially recommended where petroleum spillage occurs. Colors: maroon, tile red, brown, green, gray, light gray, natural.

KWIK-COLOR CONCRETE SEALER—Odorless, non-inflammable, easy to apply on old or new concrete. Dries in 20-30 minutes. Busy floors can be back in service 2 hours after etching, sealing, waxing. In *non-fading* tile red, light gray, and light green.

HI-POLAMUR FLOOR SEAL—Light-colored sealer made from newest polymer resins. Exceptionally hard, tough, durable, resistant to rubber burns. Outstanding abrasion resistance and good resistance to chemicals and solvents. Solids content is 30%, yet viscosity is low and penetrating ability extremely good. Normally dries in 3 hrs. No objectionable odor.

POLI-MIRRO FLOOR FINISH—Light-colored, extremely durable finish mfd. from new polymer resins. 40% solids content provides high gloss, mirror-like, non-glare, anti-slip surface of great hardness and abrasion resistance. This extra hardness makes it especially easy to clean. Usually dries in 4 hrs.

PENETRATING SEALER — Polymerized for greater penetration and sub-surface sealing of all wood floors. Protects against wear, moisture, dirt. Stands heavy traffic.

GYM FINISH—Provides hard, durable, easy-to-clean, high gloss surface, impervious to rubber burns. Fast, non-slippery footing.

ASPHALT TILE PRESERVER—Penetrates and seals with one coat. Preserves new tile beauty, revives color and finish on faded floors. Resists grease, water, soaps, alkalies. Ready for traffic in 20 min.

SUPER FLOR-TREAT—Synthetic resin finish seals all type floors. Dries to tough attractive finish in less than 1 hour. Use alone or as wax base. Odorless, non-inflammable, non-yellowing. Approved by Rubber Mfrs. Assn., meets or exceeds Asphalt Tile Inst. specs.

TERRAZZO SEALER—One coat brings out natural beauty and vivid terazzo colors. Long lasting. Seals pores, prevents chipping, corrosion. Resists water, acids, alkalies, soaps, grease, solvents.

TUFF SHEEN FLOOR SEAL—Water white, nearly odorless, non-yellowing sealer for practically all type floors except wood. Brings out natural terrazzo colors. Tough, satin-like finish seals out water and stains.

TUFF-DRI FLOOR FINISH — Extra tough, fast-drying finish for wood, concrete, creosote block, or battleship linoleum floors in industrial plants, bakeries, textile mills, institutions, commercial bldgs. Withstands heavy foot and truck traffic. Phenolic resin and tung oil base. Easy to clean, maintain.

SUPER FLOOR DRESSING—Ideal mop treatment for all type floors. Cleans, polishes, makes floors extremely resistant to rubber marking. Heavy-bodied, slow evaporating, mops are easily laundered. Pleasant aroma, no fire hazard. Also available with effective germicide which prevents bacterial growth in mops.

Your MULTI-CLEAN Distributor is listed under "Janitors Supplies" in the Yellow Pages

MULTI-CLEAN PRODUCTS INCORPORATED

Dept. AS-1-1

2277 Ford Parkway • St. Paul 16, Minn.

PULLMAN VACUUM CLEANER CORP.

25 Buick St., Boston, Mass.

SEE THE WORLD'S FINEST

2-SPEED

Floor Machine

SELECT THE RIGHT SPEED FOR THE JOB!

HI-SPEED (190 RPM) FOR DRESS-UP
- Covers larger area in less time.
- Gives higher gloss, longer wear.
- Means fewer waxings.

LO-SPEED (140 RPM) FOR CLEAN-UP
- Cuts down baseboard splashing.
- Eliminates costly hand cleaning.
- Keeps detergent under brush.

SEE THE PULLMAN SINGLE SPEED

"ADJUSTOMATIC"

With Years-Ahead Features That Leave Others Behind!

- No-stoop finger-control handle instantly adjusts to any height.
- Contour apron design for toe-space cleaning.
- Unitized assembly minimizes maintenance.
- Scientific weight-speed-brush size ratio.
- Three sizes: 12", 14", and 16".

SEE THE WORLD'S LEADING COMMERCIAL VACUUM CLEANER

PULLMAN

VACMOBILE

IN 3 MOTOR SIZES

¾ HP 1¼ - 1½ HP By Pass

The industry's standard of value and performance for 15 years.

- Free accessory kit
- Exclusive Master Tool with Slide-On Adapters

POWERFUL • PORTABLE • ECONOMICAL

NOW — ALL NEW PULLMAN

SQUEEG-MOBILE

The Attachment that Squeegee-Dries A Floor As Fast As A Man Can Walk!

- Converts any wet pickup Vacmobile to automatic squeegee with 30" path.
- Eliminates need for costly special equipment.
- Speeds work where flooding technique is used for disinfecting or maintenance.
- Simple lever touch control for right or left hand operation.
- Allows uninterrupted use of vac.

There's a 1/12 payment plan for every Pullman product!

No need for large cash outlay to buy the world's finest maintenance equipment! Buy any floor machine or vacuum cleaner from your monthly maintenance budget, not from capital outlay budget. Ask your jobber today about Pullman's thrifty 1/12 payment plan. No carrying charges — no interest!

NEW PULLMAN

HYGIENIC FILTER

The Special Accessory That Does An Amazing Job of Bacteria and Dust Control!

- Eliminates recirculation of more than 99% of all airborne bacteria and dust. A laboratory-proven fact.
- Saves time. No dusting needed after vacuuming.
- Guards against air-borne infection.
- Fits all Vacmobile models.

Pullman

PULLMAN VACUUM CLEANER CORP.

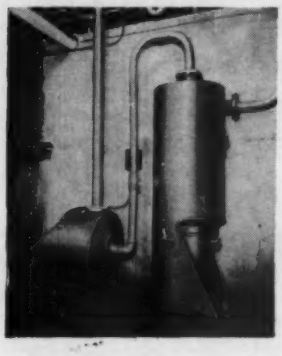
25 Buick St., Boston, Mass. ALgonquin 4-8980

Throughout America — throughout the world... more people buy Pullman than any other commercial vacuum cleaner

THE SPENCER TURBINE COMPANY
486 New Park Avenue, Hartford 6, Connecticut

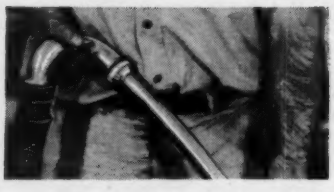
There's a SPENCER Vacuum for *Every* School Cleaning Need

VACUUM CLEANING



A Spencer stationary vacuum cleaning system, consisting of centrally located vacuum producer and dirt separator . . . with piping and outlets throughout the building . . . permits *engineered housekeeping* that is quick, easy, economical and assures *positive sanitation*. Available in a complete range of sizes from 1 HP through 100 HP to meet individual requirements. Request Catalog 133 for complete specifications.

PORTABLE VACUUM CLEANERS



A size for every requirement. Models from ½ HP up. All feature shake-out of bag *inside the machine*, making for cleaner handling and preventing escape of dust or germs. All feature patented swivel elbow joint—*exclusive with Spencer*—which makes cleaning faster and less tiring.

Spencer portables are adaptable to water pick-up and cleaning of dry mops . . . have simple cam release for quick, easy removal of dirt can.

Spencer portables—*which provide more cleaning power per dollar*—are described in Bulletin 114-J.

SWIMMING POOL CLEANING

Special Spencer tools—generally used in conjunction with pump on filtering system—permit removal of sediment without draining of pool. Request Bulletin 139.

New color movie illustrates the many uses which schools make of Spencer Vacuum. Request showing at no obligation.

VACUSLOT

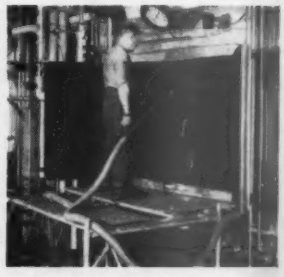
A completely new cleaning system to maintain clean mops—greatly speeds routine maintenance.

Large dust mops can be used to push dirt and litter to the Vacuslots, where high suction Spencer vacuum whisks it away. Mops are *vacuum* cleaned at the Vacuslots. Result: *dust and germs cannot escape into the air.*

Simple attachment of hose to Vacuslot valves also permits vacuum cleaning of stairs, carpeted areas, furniture, Venetian blinds, etc. Request descriptive Bulletin 153B.

BOILER CLEANING

Regular removal of soot from boiler tubes—practical with either stationary system or portables—provides proven fuel savings up to 20%. Soot and dust cannot escape into the air or resettle on floors and walls. Bulletins 117 and 137.



WATER PICK-UP

Both stationary systems and portable vacuum cleaners are adaptable to pick-up of scrubbing water or spillage. Separator tanks—with automatic shut-offs to prevent overflow—available in 8 to 100 gallon capacities.

The SPENCER TURBINE COMPANY
486 NEW PARK AVENUE
HARTFORD 6, CONNECTICUT

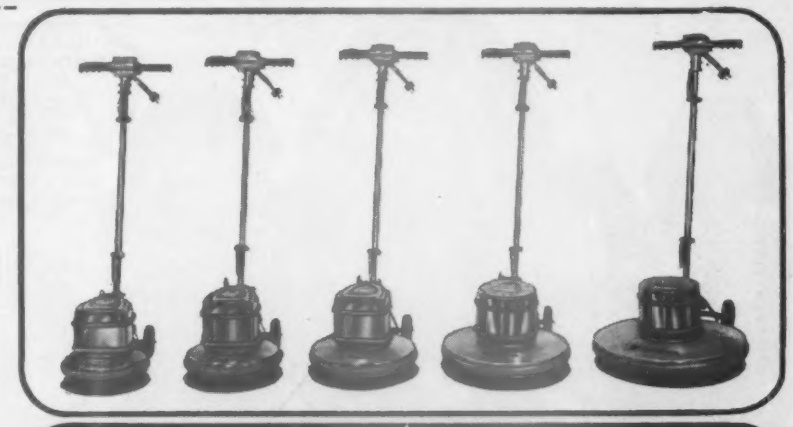
UNITED FLOOR MACHINE COMPANY, INC.

7723 South Chicago Avenue • Chicago 19, Illinois

UNICO SUPER 60 DELUXE MEDALLION SERIES

Rolls on wheels in Up or Down position

AVAILABLE IN 15", 17", 20" BRUSH SIZES

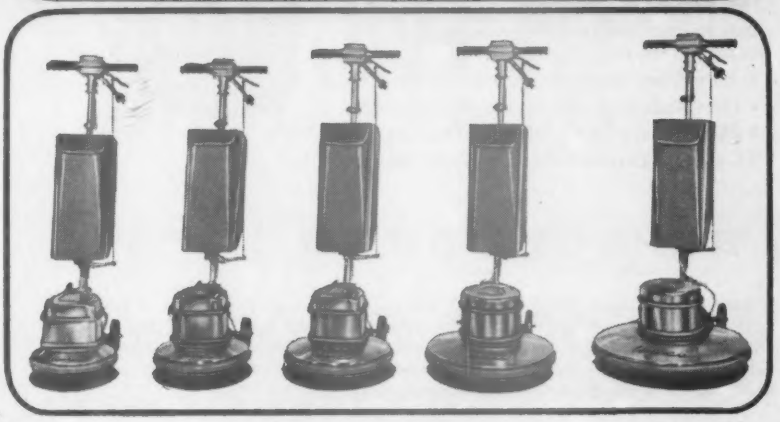


UNICO STANDARD 60

Above photo illustrates Unico Floor Polishers in 13", 15", 17", 20", 24" brush sizes. Does all floor jobs; Dry Scrubbing, Polishing, Waxing, Steel-wooling, Sanding, Buffing, better faster . . . easier . . . at lower cost.

MEDALLION SERIES

Lower photo shows the same five Polishers with solution tank attached for Wet Scrubbing all types of floor surfaces, wood, tile, composition, concrete, marble, etc. Shampoos rugs and carpets right on the floor.



STEP-DOWN Wheel Carriage

New Step-Down Wheel Carriage Control lowers 5" wheels with ease. No stooping. Toe-operated "Trigger" retracts wheels instantly.

Model UVC-901BPM

UNI-VAC Portable Vacuums For WET and DRY Pickup

UNICO portable vacuums are available in five models to meet the requirements of small or large areas. Pick up wet solutions after scrubbing floors or shampooing rugs. Provide fast, sanitary, dust-free dry sweeping. Compact, easy to maneuver. Simple to operate.

Model S-12BH Aero For Smaller Floor Areas

Small in size, mighty in performance, low in cost, easy to operate. Specially designed for maintenance of smaller floor areas. Weighs only 42 pounds, easy to carry. Features new Uni-Drive; no gears, no grease, no noise. 12" brush size.

Designed for maximum efficiency and dependability, Unico Floor Machines provide the most complete all around floor maintenance equipment ever offered. Available in a wide range of sizes, each Unico machine, with attachments, does ALL the floor maintenance work . . . every operation both WET and DRY . . . all with a single Unico machine. Keeps floors sparkling clean. Easy operation saves hours of costly labor. Sturdy construction and precision engineering insures years of trouble-free service. Fully guaranteed. Many other exclusive features make Unico your best floor machine buy . . . by far.

WRITE FOR DETAILS . . . ASK FOR FREE DEMONSTRATION ON YOUR OWN FLOORS

BENNETT MANUFACTURING COMPANY, INC.

Alden, N. Y.

Manufacturers of America's Most Complete Line of Waste Receptacles

PRESTIGE PRODUCTS
Since 1906

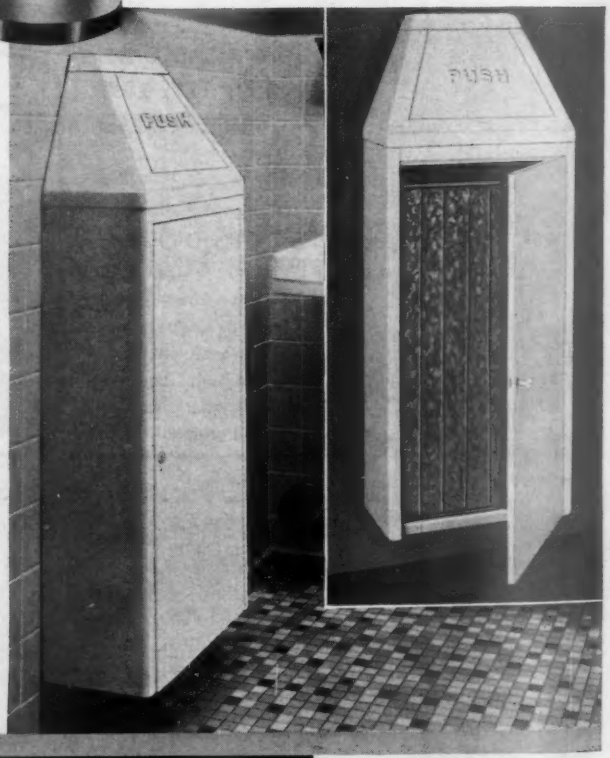
BENNETT
Self-Closing
WASTE RECEPTACLES
The Prestige Line

● Wherever people congregate, there is a place for Bennett Waste Receptacles. You'll be surprised how students co-operate in depositing waste when the receptacle is attractive. There are models for every purpose indoors or out, including our spectacular new space-saving WALL-HUNG WASTE RECEPTACLE pictured below.

14 MODELS TO CHOOSE FROM

Only Bennett Waste Receptacles have all these features:

- All welded construction, baked enamel finish
- Phosphate treated steel resists corrosion
- Stainless steel feet, reinforced bottom
- Choice of galvanized or Osnaberg bag liners



BENNETT DRUM TOPS

These clever drum tops convert your 15, 30, and 55 gallon drums into self-closing waste receptacles at spectacular savings. Write for full information regarding models and prices. Ask about our special DRUM TOP KIT that provides everything you need to convert your old drum into an attractive waste receptacle.

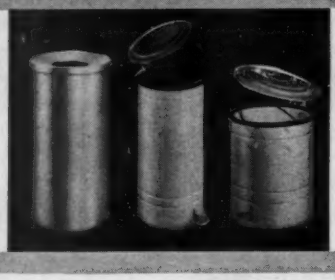
Sizes for 15 gal., 30 gal. and 55 gal. drums

WRITE FOR FREE CATALOG

BENNETT

MANUFACTURING CO., INC.

DEPT. 65, ALDEN, NEW YORK



TRADE MARK
SANI-CAN
PATENTED

The original step-on receiver, now specially built exclusively by

BENNETT...

AMERICAN DRYER CORP.

1405 Locust St., Philadelphia 2, Pa.

THE ANSWER!*

*Say Good-by to washroom problems

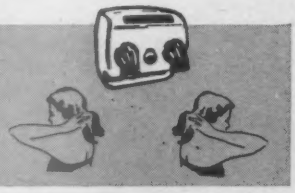
. . . hello to tidiness, economy and convenience!

American electric hand-face Dryers provide the ready answer to washroom headaches, giving you welcome tidiness and convenience—and substituting pennies for electric current in place of your present towel dollars! And American Dryers' advanced design gives you these benefits while insuring against vandalism and tampering! Full 36 month warranty on all models. Exclusive dual nozzle unit available for heavy traffic washrooms . . . Two people dry simultaneously! Write for your file copy of our "tell all" catalog today!

BOY PROOF **American** ELECTRIC HAND **Dryers**

SPEED SCHEDULES, SAVE MONEY WITH AMERICAN **HAIR** DRYERS

Save the cost of expensive Turkish towels in swimming pools, locker rooms, and showers. Single and dual nozzle units. American HAIR Dryers dry even a woman's full head of hair thoroughly in fast time. Automatic timer shut-off.

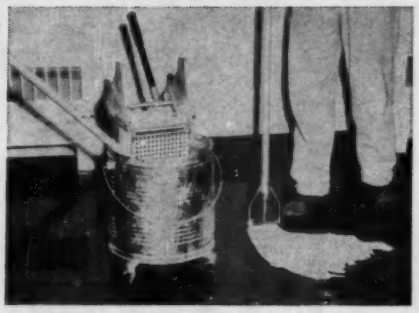


HILLYARD CHEMICAL COMPANY

Home Office and Factory, St. Joseph, Mo.

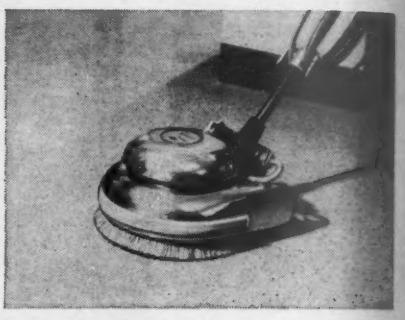
Manufacturers of Floor Cleaners, Waxes, Seals, Finishes, Floor Scrubbing and Polishing Machines and a complete line of Custodial Supplies

when it comes to School Floor Care, you're money ahead with Hillyard FLOOR TREATMENTS



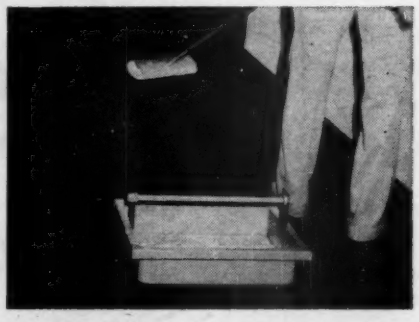
SUPER SHINE-ALL® The neutral chemical cleaner that passes radio-active isotope tests for complete dirt removal; is safe to use on any floor. Cuts scrubbing time, eliminates the whole step of rinsing.

TROPHY® The lightest, smoothest, longest-wearing, no-glare, non-slip "Gym Finish for Champions." Also conditions your floor for Phys. Ed. classes, team practice, dances, banquets, meetings. Makes your Gym a real community center.



SUPER HIL-BRITE® Made of 100% finest No. 1 prime yellow imported Carnauba. Lustrous beauty buffs back after repeated scrubbing. Eliminates 3 out of 4 rewaxings.

SUPER HIL-TONE® Speeds daily dust-up because it holds dirt on the surface by ADSORPTIVE action. Reduces count of germ-laden dust in the air. It's actually **fire-retardant** — safe on the floor, safe in the mop, safe in storage. U/L "Classified as to Fire Hazard."



POLY-KOTE® A buffable, waxless coating—Polymer resin type. Gives an extra measure of slip resistance to critical floors actually more "non skid" when wet. Hard and smooth, not tacky—for fast, easy maintenance.

KURL-OFF® No need to sand away 10 years of your floor's life when it only needs new finish. Apply this Hillyard non-flammable varnish and paint remover that strips clean, ends drudgery, makes short work of any job, large or small.

The Hillyard "Maintaineer®" will be glad to recommend specialized treatments for your problem floors, help you draw up a year-round treatment program, demonstrate modern time-saving techniques to your custodial staff. He's *"On Your Staff, Not Your Payroll"*

FLOOR HILLYARD TREATMENTS

ST. JOSEPH, MO.
San Jose, Calif.
Passaic, N. J.
Branches and Warehouses in Principal Cities

there's a

HILD *DELUXE* FLOOR MACHINE

for every maintenance job

SHAMPOOING

POLISHING

BUFFING

SCRUBBING

plus many other special tasks

HILD

Form 10

9 rugged models... 6 diff

LET HILD EXPERTS HELP YOU CHOOSE THE MO FIT

MODEL E-25

Brush Spread: 25"
Motor: 2 H.P., Heavy duty repulsion induction
Brush RPM: 172

Cable Length: 50'
Cable Size: 12 gauge, 3 conductor
Weight with brush: 161 lbs.
Weight of Shower-feed model with brush: 169 lbs.
Also available: Model J-25, same as above except with rigid wheel carriage.

MODEL F-22

Brush Spread: 22"
Motor: 1 H.P., heavy duty, capacitor type
Brush RPM: 172

Cable Length: 50'
Cable Size: 3 Conductor, 12 gauge
Weight with brush: 128 lbs.
Weight of Shower-feed model with brush: 134 lbs.
Also available: Model H-22, same as above with rigid wheel carriage

MODEL D-19

Brush Spread: 19"
Motor: Heavy duty 1 H.P. capacitor type
Brush RPM: 172

Cable Length: 50'
Cable Size: 12 gauge, 3 conductor
Weight with brush: 118 lbs.
Weight of Shower-feed model with brush: 136 lbs.
Also available: Model UD-19 same as above with ¾ H.P. motor

MODEL G-1

Brush Spread:
Motor: ¾ H.P.
capacitor type
Brush RPM: 17

Cable Length: 40'
Cable Size: 14 gauge, 3 conductor
Weight with brush: 102
Weight of Shower-feed machine with brush: 122

HILD
DeLuxe
shower-feed scrubbing and carpet shampooing

All Hild Deluxe Floor Machines are available as Shower-feed models for use with 3½* gallon solution tank and special aluminum back brush.

HILD SHOWER-FEED TANKS are made of Royalite plastic designed to last as long as the life of the machine. Cleaning solution is released by a lever on the left handle which activates a new Hild self-closing valve on the bottom of the tank. This flow of solution can be further regulated by a feed control valve below the solution valve. The new one piece brass and stainless steel valve can be completely disassembled in five minutes if necessary.

**Special 5 gallon solution tanks are available at extra cost. Royalite tanks available after May 1, 1961. Until then terneplate tanks will be supplied as standard equipment. Stainess steel tanks available at extra cost.*

HILD PATENTED SHOWER-FEED BRUSH, proven in many years use and still has no equal for efficient distribution of shampoo scrub solution.

Cleaning solution is fed from tank through special double spout feed on base casting. It then falls on to the back of the brush and passes through scientifically spaced holes between each row of bristles. Every drop is caught and agitated by the bristles. Every square inch of carpeting or floor gets a unifo amount of cleaning solution.

Hild Shower-feed Brushes can be fil and refilled with a variety of bristles Bassine, Mixed Fibre, Palmetto, Nyl Steel Wire, etc., depending on the you want to do.

All Hild Shower-feed Brushes are minum back type, except models F- H-22, E-25 and J-25 which are made specially processed wood due to th size.

Specifications subject to change without notice

...nt sizes...

...IT YOUR EVERY NEED

MODEL C-16

Brush Spread: 16"
Motor: ½ H.P. capacitor type
Brush RPM: 172

...ength: 40'
...e: 14 gauge, 3
...or
...with brush: 92 lbs.
...of Shower-feed
...with brush: 105 lbs.
...ilable: Model UC-16, ...above except with ...motor

MODEL VA-14

Brush Spread: 14"
Motor: ½ H.P. capacitor type
Brush RPM: 172

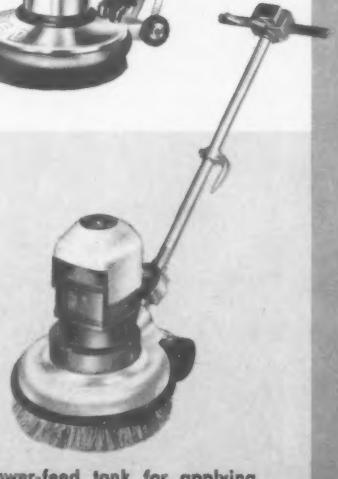
Cable Length: 40'
Cable Size: 16 gauge, 3 conductor
Weight with brush: 84 lbs.
Weight of Shower-feed machine with brush: 96 lbs.

...NT TYPE RUG ...UBBING MACHINES

...production in medium size ...aning plant. Both shampoo ...n and rinse water are "on ...Twisting the grip forward ...n the shampoo, twisting it ...rd turns on the water. No ...me, no wasted materials. ...206 r.p.m. gear unit* in...st coverage. All size mod...ilable.
...ble on standard Shower...achines at extra cost.

...OSION PROOF ...R MACHINE

...ize floor maintenance in ..., Group D and Class II, ...G hazardous locations. ...ul 16" floor machine with ...interchangeable brush at...nts for fast scrubbing and ...g of all types of floors. ...Detail of this unit designed ...it to the very highest safety ...ments for refineries, grain ...tc. Entire unit is UL listed.



Shower-feed tank for applying scrubbing solution available.

The DELUXE Features

designed for durability and efficiency which Hild machines have offered for over 35 years

HANDLE
Fully adjustable to any position for operating ease. Handle consists of cast aluminum alloy switch box with steel handle inserts cast into heavy aluminum section for handle grips. Minimum wall thickness of casting 3/16 of an inch.

HANDLE GRIPS
Blue nonmarking plastic—prevents marring of desks, walls, etc.*

SWITCH LEVER
Twin levers on switch box allow hand relief and ease of operation. Either lever controls machine.

MOMENTARY CONTACT SAFETY SWITCH
Designed for maximum safety and performance. UL listed for 30 amp constant duty current. Switch has been tested on constant duty—being switched on and off for 4000 hours. Easily replaced if change is eventually needed.

TUBE
Cold rolled 14 gauge steel—heavily chrome plated and highly polished.

CORD
Heavy duty, 3 conductor type, flexible "S" jacket with blue nonmarking rubber cover. Attaches to side of switch box with heavy chrome plated spring steel strain relief. Cord does not interfere with operator's movement. Grounding adapter attached to plug.*

ADJUSTABLE CLAMP
Heavy duty brass casting with highly polished chrome plating. Attached to "quick action" screw handle bolt with highly polished aluminum knob. One-half turn completely loosens or tightens the handle.

BASE CASTING
Highly polished aluminum casting designed to give good balance and smooth operation. Minimum thickness of 5/16 inch plus reinforcing ribbing on underside insure durable performance. All machining is held to tolerance of .002 of an inch.

WHEELS
Blue non-marking neoprene wheels, 4½" in diameter and ⅞" wide for easy movement. Wheels retract for perfect balance and full brush use. String guards have trouble-free design and are chrome plated.*

WHEEL CARRIAGE
High polish heavy section cast aluminum bars with chrome plated stress proof steel shaft.

BUMPER
Blue non-marking vinyl plastic designed with air pockets to give "cushion" action. Bumper is attached with cadmium plated steel band and anchored in two positions. It cannot loosen or move.

MOTOR
Hild motors are capacitor type of high torque, fast starting design, with 1.25 service factor. Designed for constant duty and for operation under overload without danger of breakdown. Only 40 degrees Centigrade temperature rise. Only precision ball bearings are used to assure you of noise free operation. Hild motors have the lowest amperage consumption with the highest starting and running torque.

GEAR UNIT
Hild, Watson-Flag type. This three planetary gear unit is an integral part of the motor and has rendered highly satisfactory service for the past 20 years. Thick ½" lugs for brush attachment assure many years of use even when abused.

BRUSH
Brushes are packed tightly with 1⅝" highest quality bristle for smooth operation and long life. The brass brush holder is attached with six rust-resisting screws.

**Blue handle grips, cord and wheels available on models after May 1, 1961.*

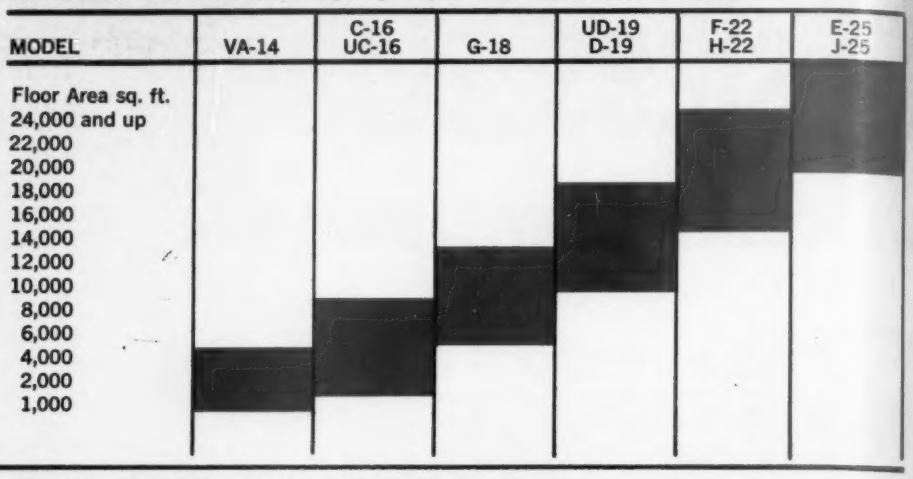
HILD DELUXE FLOOR MACHINES ARE DESIGNED FOR CONSTANT DAILY USE

They are warranted for a full two-year period after date of shipment from factory against defective parts and/or workmanship.
UL listed and CSA approved.

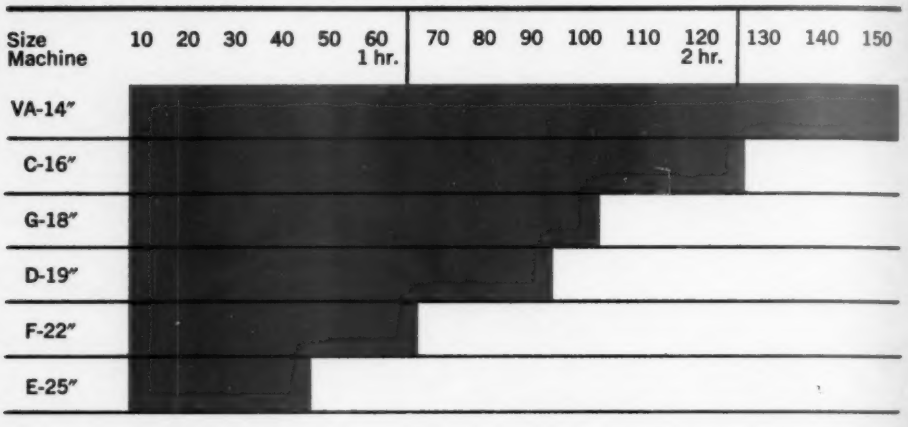
HOW TO SELECT THE MACHINE YOU NEED

Since 90% of the floor maintenance costs are labor, be sure you select the most economical size machine for your use. The following two charts will show you how much labor time the correct size unit can save and also show the approximate floor areas each unit is designed for.

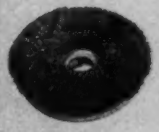
RECOMMENDED SIZE MACHINES—the following chart indicates basic size recommendations, other factors such as obstructions, frequency of use, etc., must be considered.



AVERAGE TIME REQUIRED TO BUFF 5,000 sq. ft. AREA

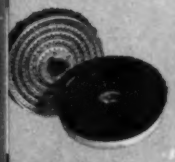


YOU CAN DO ALL THIS AND MORE WITH YOUR HILD FLOOR MACHINE AND EASILY INTERCHANGEABLE ATTACHMENTS!

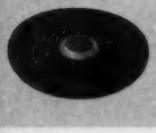


POLISHING waxed floors to a hard lustrous finish with a wood-back union fibre brush. Also used to buff away scuff marks left by daily traffic. Palmetto, bassine or mixed fibre may also be used for this work.

SCRUBBING floors with wood-back brush for plain handle Hild Floor Machines. Bassine, Palmetto, Mixed fibre, steel wire or bassine and steel wire, may be used efficiently.



SHOWER-FEED SCRUBBING floors quickly and clean. Also used for shampooing rugs and carpets. Hild shower-feed brushes are filled with bassine, palmetto, nylon, steel wire, or mixed fibre.



POLISHING with lambs wool or felt buffer. Removes streaks, goes under radiators, polishes waxed cove baseboards. Wood disc on top of buffer keeps pad in center of brush.

"DRY SCRUBBING" concrete or wood block factory floors with butcher wire brush. Removes stubborn, hard-caked grease and dirt . . . much faster than chipping off with hand spud. Does not mar or loosen wood blocks.

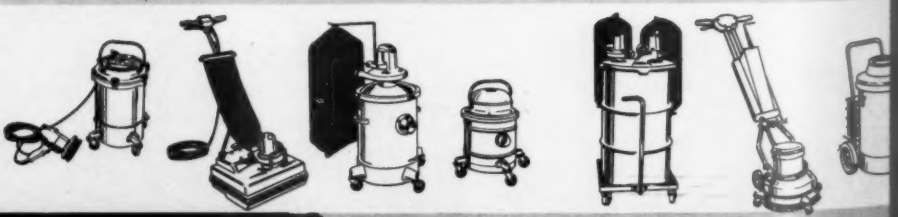
MAINTAINING FLOOR WITH SYNTHETIC OR STEEL WOOL PADS. Used for dry-cleaning, scrubbing, stripping all types of floors. Both "thick" and "thin" types synthetic pads available. Also non-ravelling steel wool for wet buffing penetrating seals, dry scrubbing, etc.

GRINDING marble and terrazo floors with carborundum grinding disc.

SANDING wood or cork tile floors. A 3 inch flat countersunk plate holds cloth back sandpaper firmly to the rubber padded metal disc.

TROWELLING fresh laid concrete with your Hild machine. Far more efficient and faster than the hand method.

HILD . . . the leading manufacturer of industrial vacuum cleaners, floor maintenance machines and carpet and upholstering cleaning equipment



Printed in U.S.A.

HILD FLOOR MACHINE COMPANY, INC.

1217 WEST WASHINGTON BLVD. CHICAGO 7, ILLINOIS

Factory 250 E. 43rd St. 4271 W. Third St. 1329 Jackson 4419 W. Center St. 2232 N. Dixie

Branches: New York 17, N.Y. Los Angeles 5, Calif. Memphis, Tenn. Milwaukee, Wis. West Palm Beach, Fla.

Canadian Branch: 181 Pioneer Ave. Winnipeg 1, Manitoba Export Dept. 1066 S. Western Ave. Chicago 12, Ill.

M-4/Hu.
HUNTINGTON FLOOR MAINTENANCE SPECIFICATIONS
HUNTINGTON LABORATORIES
A.I.A. File No. 25G
START PLANNING YOUR MAINTENANCE PROGRAM NOW IF YOU WANT EXTRA YEARS OF LIFE FROM YOUR NEW SCHOOL BUILDING!

IMPORTANT FACTS to consider before you build the new school!

Q. Which costs more . . . maintenance materials or maintenance labor?

A. If you have answered labor, you're right. Scientifically controlled surveys have proved that 95 cents of every maintenance dollar goes for labor . . . *and materials cost only five cents!*

What does this mean to you? Although your new school is probably not yet built, it is not too early to begin thinking of how to keep down the maintenance costs . . . to plan a program that protects and beautifies this new school.

Huntington has a simple suggestion that has helped many school executives effectively combat the high maintenance costs and, at the same time, keep the new school new-looking far longer. *Resolve right now to use only the very best maintenance materials.* High quality maintenance products enable the maintenance crews to get the job done right the first time and to finish the task in a minimum of time, too.

Huntington has been creating school maintenance products for more than 40 years. And during these 40-odd years, Huntington has maintained a reputation for high quality and fair dealing. You'll find these maintenance specifications and Huntington products will help you save money through reduced labor and greater protection:

CONCRETE FLOORS

THE PROBLEM • *To eliminate dusting and prevent efflorescence or blooming. Also, sealed concrete floors resist the wear of traffic, are more beautiful and are easier to maintain.*

THE SOLUTION TO THE PROBLEM • SPECIFICATIONS • ***New Floors:*** When concrete is set and surface is dry, apply one coat of Huntington Concrete Seal. Follow manufacturer's recommendations on product label. (Neutralizing the floor is not necessary when Huntington Concrete Seal is used, but the surface must be perfectly dry.) One or two additional coats should be applied at one week intervals (to prevent whitening from moisture) until pores are filled. *Coverage:* approximately 500 square feet per gallon.

If a colored coating is desired, the floor must first be neutralized with Huntington No. 1 Cleaner to remove excess lime. Follow manufacturer's recommendations on product label. Floor should then be thoroughly rinsed with clear water and allowed to dry completely. To apply colored coating, mix Seal-O-San Enamel and Penetrating Seal-O-San half and half (for first coat only). One or two additional coats of enamel only should be applied until colored coating is satisfactory. Follow manufacturer's recommendations on product labels. *Coverage:* 400 to 500 square feet per gallon. (Do not paint concrete which has *not* been sealed if it is less than one year old. Concrete floors on which a concrete hardener has been used *cannot be painted.*) Enamel finish should be protected with two coats of Contrast Floor Polish. *Coverage:* approximately 2000 square feet per gallon.

THE PRODUCTS • When applied to newly laid concrete, ***Huntington® Concrete Seal*** slows up drying and assures better curing. It penetrates and seals the tiny cracks and pores to form a tough, satiny surface which is non-slippery, waterproof and simple to maintain. Huntington Concrete Seal eliminates the problems of staining, blooming and dusting; is exceedingly durable and unaffected by alkalis and alkali salts; and prevents discoloration and damage from improper cleaning methods. A clear and practically colorless liquid, it will not darken light floors, does not yellow with age.

Huntington No. 1® Cleaner removes rust, dirt, grease, wax and oils from the surface. It is an excellent cleaner for preparing surfaces for sealing and painting when etching is necessary.

Seal-O-San® Enamel is an ideal colored coating for concrete floors because of its great durability. Non-slippery. For best results, concrete should be one year old or older before applying Seal-O-San Enamel. Write for colors.

Penetrating Seal-O-San® is an especially durable concrete seal but will darken floors slightly. Ideal for use with Seal-O-San Enamel when a colored coating is desired on the concrete floor. Penetrating Seal-O-San will not build up on the surface and is very easy to keep clean.

Contrast® Floor Polish is an ideal slip-resistant finish for floors that are subject to heavy traffic and other abuses. A colorless, wax-free polish with a water base, it cannot darken floors, including pure white floors, even with age. Easy to apply, Contrast dries to a high-gloss initial finish without buffing. However, after a period of heavy use, it may be buffed to clean the floor thoroughly and to help renew the gloss. May be used on all types of floors except conductive floors. Will not water spot, scuff or rubber mark . . . makes maintenance easy.

A wide variety of ***other Huntington waxes and polishes*** to protect and beautify all types of floors is available. Ask our representative, the Man Behind the Huntington Drum, to recommend the best wax or polish to withstand the traffic conditions of your individual floors.

TERRAZZO FLOORS

THE PROBLEMS • **1.** *To slow up the curing process and protect the surface during construction.* (Proper, slow curing of terrazzo assures greater density of the matrix and produces a more beautiful, more durable floor.) After the terrazzo is set, before grinding and polishing, it should be sealed to hold in moisture. **2.** *To seal the porous matrix against moisture, grease, acid and stains. Dusting and blooming are also eliminated by sealing.* After grinding, the application of a good sealer is again important. Terrazzo has a smooth surface which is 70 per cent or more marble and about 30 per cent neat Portland cement matrix. The cement is porous and must be sealed.

THE SOLUTION TO THE PROBLEMS • SPECIFICATIONS • ***New Floors:*** Apply one liberal coat of Huntington Terrazzo Seal after floor is rough-stoned and grouted and is "surface dry." Then allow floor to cure for at least six days. After final grinding and polishing, scrub thoroughly with Spal Concentrate soapless detergent. Scrub and rinse approximately 200 square feet (10′ x 20′) at a time until the entire floor is clean. After rinsing floor, allow it to dry completely. Apply two additional thin coats of Huntington Terrazzo Seal. Follow manufacturer's recommendations on product labels. *Coverage:* approximately 1000 square feet per gallon. If waxed floors are desired, apply two coats of Contrast Floor Polish after final coat of seal is thoroughly dry. *Coverage:* approximately 2000 square feet per gallon.

New Floors (Alternate): Rather than applying both a seal and a wax to terrazzo floors, you may prefer a combination product. If so, after the floor has been cleaned and is thoroughly dry, apply two very thin coats of Poli-Seal Polish and Sealer. Follow manufacturer's recommendations on product label. *Coverage:* 1200 to 1500 square feet per gallon.

THE PRODUCTS • ***Huntington® Terrazzo Seal*** provides a tough, waterproof seal with a safe, non-slippery surface. It protects terrazzo floors and preserves their beauty. Will not darken light floors, does not discolor with age. Exceedingly durable, impervious to water, unaffected by alkalis or alkali salts. Prevents discoloring and damage from improper cleaning methods. Simplifies maintenance, provides the best base for waxes.

Spal® Concentrate soapless detergent cleans quickly and leaves no film. Makes floors sparkle. Penetrates greasy, oily dirt but will not harm any surface which is not harmed by water alone.

Contrast® Floor Polish—see description under "Concrete Floors."

Poli-Seal® Polish and Sealer does two jobs in one simple operation. It combines a tough, water-resistant seal with a high-gloss polish. Easy to apply; dries quickly; keeps floors light, beautiful and new-looking. Slip-resistant. Floors need no further sealing or waxing when Poli-Seal is used.

CERAMIC TILE FLOORS

THE PROBLEM • *To lock out moisture, grease and stains and to prevent blooming.* Ceramic tiles are set in concrete, and the concrete matrix between the tiles must be sealed.

THE SOLUTION TO THE PROBLEM • The matrix in ceramic tile floors should be allowed to cure. The floors should be cleaned and dried . . . and, finally, sealed and/or waxed.

SPECIFICATIONS • ***New Floors:*** Clean thoroughly with Spal Concentrate soapless detergent. Scrub and rinse approximately 200 square feet (10′ x 20′) at a time until the entire floor is clean. After rinsing floor, allow it to dry completely. Then apply two thin coats of Huntington Terrazzo Seal. Follow manufacturer's recommendations on product label. Allow seal to dry thoroughly before opening to traffic or before waxing. *Coverage:* approximately 500 square feet per gallon. If waxed floors are desired, apply two coats of Contrast Floor Polish. *Coverage:* approximately 2000 square feet per gallon.

New Floors (Alternate): Rather than applying both a seal and a wax to ceramic tile floors, you may prefer a combination product. If so, after the floor has been cleaned and is thoroughly dry, apply two very thin coats of Poli-Seal Polish and Sealer. Follow manufacturer's recommendations on product label. *Coverage:* 1200 to 1500 square feet per gallon.

PRODUCTS • ***Spal® Concentrate*** soapless detergent—see description under "Terrazzo Floors."

Huntington® Terrazzo Seal should be applied to seal the matrix to protect it against moisture. See additional description under "Terrazzo Floors."

Contrast® Floor Polish, when applied to sealed Ceramic Tile Floors, assures non-slip safety and provides additional protection to the matrix against moisture. See additional description under "Concrete Floors."

Poli-Seal® Polish and Sealer—see description under "Terrazzo Floors."

MARBLE FLOORS

THE PROBLEM • *To protect against scratches and stains on the polished surface.* Marble is principally calcium carbonate in crystalline form. It is often quite porous and should be sealed and/or waxed.

THE SOLUTION TO THE PROBLEM • Clean marble floors carefully, avoiding the use of acids and gritty scouring powders. Use cleaning crystals only with the proper safeguards. A liberal application of clear water should be used before any cleaning compound is applied.

SPECIFICATIONS • ***New Floors:*** Clean thoroughly with Spal Concentrate soapless detergent. Scrub and rinse approximately 200 square feet (10′ x 20′) at a time until the entire floor is clean. After rinsing floor, allow it to dry completely. Then apply two thin coats of Huntington Terrazzo Seal. Follow manufacturer's recommendations on product label. *Coverage:* approximately 1000 square feet per gallon. If waxed floors are desired, apply one coat of Contrast Floor Polish. *Coverage:* approximately 2000 square feet per gallon.

New Floors (First Alternate): If marble floors are to be waxed only (and not sealed), first clean floor thoroughly with Spal Concentrate soapless detergent. Scrub and rinse approximately 200 square feet (10′ x 20′) at a time until the entire floor is clean. After rinsing floor, allow it to dry completely. Then apply two coats of Contrast Floor Polish. *Coverage:* approximately 2000 square feet per gallon.

New Floors (Second Alternate): Rather than applying both a seal and a wax to marble floors, you may prefer a combination product. If so, after the floor has been cleaned and is thoroughly dry, apply two very thin coats of Poli-Seal Polish and Sealer. Follow manufacturer's recommendations on product label. *Coverage:* 1200 to 1500 square feet per gallon.

PRODUCTS • ***Spal® Concentrate*** soapless detergent—see description under "Terrazzo Floors."

Huntington* Terrazzo Seal is a rubber-based product which makes it resistant to alkalis. Gives floors a high shine with no darkening, even on white marble. Non-slippery. See additional description under "Terrazzo Floors."

Contrast® Floor Polish—see description under "Concrete Floors."

Poli-Seal* Polish and Sealer—see description under "Terrazzo Floors."

WOOD FLOORS (other than gyms)

THE PROBLEMS • **1.** *To seal and protect wood flooring against wear, discoloration, moisture and excessive dryness.* **2.** *To avoid hard, surface-type seals or varnishes that discolor, dry out, crack and chip away.* **3.** *To provide a safe, non-slippery surface which is simple to maintain.*

THE SOLUTION TO THE PROBLEMS • All of the Seal-O-San products are easy to use. They are simple to apply with a mop or a lambswool applicator. They are penetrating and self-leveling; so it is simple to apply a uniformly thin coat over the entire floor. However, to avoid any possibility of lap marks, the floor which is to be sealed should be laid out in sections approximately six to 10 feet square—and then sealed section by section. There are several methods for applying seal. Follow manufacturer's recommendations on product labels for detailed directions. Wood floors (*other than gyms*) should be waxed with Contrast Floor Polish to protect the surfaces. *Wood gym floors should not be waxed.*

SPECIFICATIONS • ***These specifications are suggested possibilities.*** Floor finishing must vary according to the traffic to which each individual floor will be subjected. Drawing upon many years of experience in the floor finishing field, our representative, the Man Behind the Huntington Drum, can recommend the best materials for nearly any situation . . . and he is backed by a complete laboratory with over 40 years of experience.

New Floors: After floor has been sanded, sweep or vacuum to remove loose dust. Then remove all traces of sanding dust by sweeping with a tack rag folded around a floor brush. Apply one coat of Penetrating Seal-O-San. Follow manufacturer's recommendations on product label. Allow finish to dry 24 to 48 or more hours. Scour with Silent Huntington* Floor Machine, using No. 2 or 3 steel wool or nylon fiber pad. Remove all traces of dirt and dust as before. Apply two additional coats of Penetrating Seal-O-San, scouring and removing dirt and dust between coats. *Coverage:* 400 to 500 square feet per gallon. If waxed floors are desired, apply two coats of Contrast Floor Polish after final coat of Seal-O-San is thoroughly dry. *Coverage:* approximately 2000 square feet per gallon.

When painted or decorated areas are desired, apply one or two coats of Seal-O-San Enamel in the color(s) desired. Follow manufacturer's recommendations on product label. *Coverage:* 400 to 500 square feet per gallon. Wax to protect enamel finish.

Caution: Use *fresh* applicator pads to apply each coat of seal or else be sure the pads have been washed thoroughly in turpentine or mineral spirits. Also, if the seal has been allowed to remain in a partially empty container overnight or longer, strain it through a fine nylon mesh (like a woman's hose) to remove any foreign matter or congealed seal. This will decrease the occurrence of "pimples" on the floor when the seal is used.

THE PRODUCTS • ***Penetrating Seal-O-San®*** is the ideal finish for most heavily trafficked wood floors outside the gym. A light, thin, deeply penetrating, plastic-type sealer, Penetrating Seal-O-San sinks into the wood, strengthens the wood fibers and protects the floor against wear. Traffic lanes may easily be patched if they appear. Penetrating Seal-O-San produces a satiny surface without gloss. Approved by the Maple Flooring Manufacturers Association.

Contrast® Floor Polish—see description under "Concrete Floors."

Seal-O-San® Enamel will seal, preserve and decorate wood floors. It is applied like all other Seal-O-San products—merely mopped on the floor. This enamel has great durability and is slip-resistant. Write for colors.

WOOD GYM FLOORS

THE PROBLEMS • **1.** *To provide the best possible playing floor . . . non-skid, with a glareless surface which is light in color . . . which will not rubber burn and will give long service, under fast action, without expensive refinishing.* **2.** *To protect the wood from wear yet provide a multi-purpose floor which will take the heaviest use, even where use means abuse, which is still simple to maintain at low cost.*

THE SOLUTION TO THE PROBLEMS • All of the Seal-O-San products are easy to use. They are simple to apply with a mop or a lambswool applicator. They are penetrating and self-leveling; so it is simple to apply a uniformly thin coat over the entire floor. However, to avoid any possibility of lap marks, the floor which is to be sealed should be laid out in sections approximately six to 10 feet square—and then sealed section by section. Follow manufacturer's recommendations on product labels for detailed directions.

SPECIFICATIONS • ***These specifications are suggested possibilities.*** Some gyms may be used for various purposes—such as cafeterias, assemblies and even as roller-skating rinks. Drawing upon many years of experience in the floor finishing field, our representative, the Man Behind the Huntington Drum, can recommend the best materials to use on your gym floors, depending upon the use—or abuse—which the floor receives.

New Floors: After floor has been sanded, sweep or vacuum to remove loose dust. Then remove all traces of sanding dust by sweeping with a tack rag folded around a floor brush. Apply one coat of Crystal Seal-O-San or Seal-O-San Gym Floor Finish. Follow manufacturer's recommendations on product label. Allow finish to dry for 24 to 48 or more hours. *Coverage:* 400 to 500 square feet per gallon. Scour with Silent Huntington* Floor Machine, using No. 2 or 3 steel wool or nylon fiber pad. Remove all traces of dirt and dust as before. Paint the court lines with Seal-O-San Gym Line Paint. Follow manufacturer's recommendations on product label. *Coverage:* 500 to 600 square feet per gallon. (For complete instructions on lining gym floors, including excerpts from the Official Rules, and marking diagrams, consult the booklet, "Huntington Gym Floor Manual," published by Huntington Laboratories, Inc.) Apply *two coats* of Crystal Seal-O-San or Seal-O-San Gym Floor Finish, scouring and removing dirt and dust between coats. Follow manufacturer's recommendations on product label. *Coverage:* 400 to 500 square feet per gallon. Let cure as long as possible before receiving heavy traffic. *Do not wax wood gym floors.*

Caution: Use *fresh* applicator pads to apply each coat of seal or else be sure the pads have been washed thoroughly in turpentine or mineral spirits. Also, if the seal has been allowed to remain in a partially empty container overnight or longer, strain it through a fine nylon mesh (like a woman's hose) to remove any foreign matter or congealed seal. This will decrease the occurrence of "pimples" on the floor when the seal is used.

THE PRODUCTS • ***Crystal Seal-O-San®*** is a light, bright, non-darkening, durable finish for hardwood gym floors. It is non-slippery, glare-free and resistant to rubber burns. Crystal Seal-O-San assures safe, sure footing. Easy to apply and maintain, reduces costly scrubbing and refinishing. Approved by the Maple Flooring Manufacturers Association.

Seal-O-San® Gym Floor Finish is quite similar to Crystal Seal-O-San in durability and other properties and is an older formulation. Approved by the Maple Flooring Manufacturers Association.

Seal-O-San® Gym Line Paint is a special paint for use with all types of Seal-O-San finishes. It is used for marking lines or for decoration on wood gym floors. Write for colors.

There are other Seal-O-San products for specific uses. These products are ***Penetrating Seal-O-San®***, which provides the ideal prime coat before Crystal Seal-O-San or Seal-O-San Gym Floor Finish is applied (see additional description under "Wood Floors (other than gyms)"), and ***Super Seal-O-San® Gym Floor Top Coat***, which is a specially prepared finish to be used over any other Seal-O-San products where the flooring is likely to receive extremely heavy use. Super Seal-O-San also provides a beautiful finish on woodwork, furniture, etc.

ASPHALT TILE GYM FLOORS

THE PROBLEM • *To assure a non-slippery, safe playing area.* Gym floors surfaced with asphalt tile must be finished with a skid-proof wax which permits fast playing action while it protects the floor and preserves floor beauty.

THE SOLUTION TO THE PROBLEM • Never apply solvent-type waxes to asphalt tile gym floors. Instead, use an approved water-dispersed, anti-skid product, like Contrast Floor Polish. Apply in very thin coats. Keep floors dust-free.

SPECIFICATIONS • ***New Floors:*** Do not wash or wax a newly laid floor for two weeks after installation. Then clean floor thoroughly with Spal Concentrate soapless detergent. Scrub and rinse approximately 200 square feet (10′ x 20′) at a time until the entire floor is clean. When mopping with Spal, remove adhesive excess or other marks with Silent Huntington* Floor Machine, using No. 1 steel wool or nylon fiber pad. After floor is clean and dry, seal with Naganal Asphalt Tile Sealer. Follow manufacturer's recommendations on product label. *Coverage:* 1200 to 1500 square feet per gallon. When Naganal has dried, apply two coats of Contrast Floor Polish. *Coverage:* approximately 2000 square feet per gallon.

THE PRODUCTS • ***Spal® Concentrate*** soapless detergent—see description under "Terrazzo Floors."

Naganal* Asphalt Tile Sealer has been formulated to prevent excessive wear to mastic and asphalt tile surfaces. It seals porous floor surfaces and provides

an excellent base for wax. When used on old, checked asphalt tile and vinyl asbestos floors, Naganal renews their color.

Contrast® Floor Polish—see description under "Concrete Floors."

ASPHALT TILE, VINYL ASBESTOS, LINOLEUM and RUBBER TILE FLOORS

THE PROBLEMS • **1.** *To protect the surface of all floors of the resilient or "soft" type.* **2.** *To maintain their beauty and simplify maintenance.* Waxes containing oils and solvents should never be used on asphalt or rubber tile.

THE SOLUTION TO THE PROBLEMS • New floors must have time to conform to the subfloor surface and for the adhesive to set and dry. No moisture should be allowed on the floor for a period of two weeks after installation. Scrubbing at this time can quickly and permanently destroy the appearance and value of the flooring material. At the end of the waiting period, scrub the floor with a neutral cleaner and apply two coats of water-dispersed wax.

SPECIFICATIONS • ***New Floors:*** Do not wash or wax a newly laid floor for two weeks after installation. Then clean floor thoroughly with Spal Concentrate soapless detergent. Scrub and rinse approximately 200 square feet (10′ x 20′) at a time until the entire floor is clean. When mopping with Spal, remove adhesive excess or other marks with Silent Huntington* Floor Machine, using No. 1 steel wool or nylon fiber pad. (On *porous* asphalt tile or vinyl asbestos floors, it is best to seal them with one or more coats of Naganal Asphalt Tile Sealer after they are clean and dry. This will provide the best base for waxes and will simplify maintenance. Follow manufacturer's recommendations on product label. *Coverage:* 1200 to 1500 square feet per gallon.) After floor is dry (if sealed, when Naganal has dried), apply two coats of Contrast Floor Polish. *Coverage:* approximately 2000 square feet per gallon.

THE PRODUCTS • ***Spal® Concentrate*** soapless detergent—see description under "Terrazzo Floors."

Naganal* Asphalt Tile Sealer—see description under "Asphalt Tile Gym Floors."

Contrast® Floor Polish—see description under "Concrete Floors."

There are many other Huntington waxes for specific uses. Ask our representative, the Man Behind the Huntington Drum, for more information about ***Weatherall* Wax, Neo-Shine® Concentrated Self-Shining Wax, Bristolite® Floor Wax, Cosmolite® Anti-Slip Wax and still other Huntington waxes for special applications.*** These self-polishing, water-dispersed waxes were developed for "soft" floors. Like Contrast Floor Polish, which is recommended in the specifications at left, these waxes will not injure resilient floors in any way and will protect them against traffic, moisture, oil and other dirt.

VINYL FLOORS

THE PROBLEMS • **1.** *To protect and preserve the surface of vinyl floors.* **2.** *To prevent discoloring.*

THE SOLUTION TO THE PROBLEMS • New floors must have time to conform to the subfloor surface and for the adhesive to set and dry. No moisture should be allowed on the floor for a period of two weeks after installation. Scrubbing at this time can quickly and permanently destroy the appearance and value of the flooring material. At the end of the waiting period, scrub the floor with a neutral cleaner and apply two coats of water-dispersed wax.

SPECIFICATIONS • ***New Floors:*** Do not wash or wax a newly laid floor for two weeks after installation. Then clean floor thoroughly with Spal Concentrate soapless detergent, *using a minimum of water to protect against loosening the adhesive material.* Scrub and rinse approximately 200 square feet (10′ x 20′) at a time until the entire floor is clean. When mopping with Spal, remove adhesive excess or marks with Silent Huntington* Floor Machine, using No. 1 steel wool or nylon fiber pad. Apply one or two coats of Contrast Floor Polish. *Coverage:* approximately 2000 square feet per gallon.

THE PRODUCTS • ***Spal® Concentrate*** soapless detergent—see description under "Terrazzo Floors" and "Conductive Floors (all types)."

Contrast® Floor Polish will not discolor or darken vinyl floors, including pure white floors, even with age. See additional description under "Concrete Floors."

CORK TILE and CORK CARPET FLOORS

THE PROBLEM • *To preserve the beauty and color of cork and prevent the porous surface from absorbing stains.* Cork should be sealed or waxed, or both, to increase long life and simplify maintenance. Wax alone is suitable for cork tile, but cork carpet *requires* sealing.

THE SOLUTION TO THE PROBLEM • Cork makes a beautiful floor which will last for many years when it is properly maintained. Sealing and waxing is most desirable, particularly on floors that will receive heavy use.

SPECIFICATIONS • ***New Floors:*** Do not wash or wax a newly laid floor for two weeks after installation. Then clean floor thoroughly with Spal Concentrate soapless detergent. *Be sure that all factory-applied wax has been removed from the cork before applying the seal.* To assure this, *three* scrubbings with Spal, including scouring with a Silent Huntington* Floor Machine, using a No. 1 steel wool or nylon fiber pad, are recommended. Also, wax may be removed by disc-sanding. Or *you may specify unwaxed tiles when ordering.* When cleaning, scrub and rinse approximately 200 square feet (10′ x 20′) at a time until the entire floor is clean. After rinsing floor, allow it to dry completely, keeping all moisture off floors for two weeks. After the drying period, apply three or four coats of Seal-O-San Gym Floor Finish. Follow manufacturer's recommendations on product label. Allow finish to dry 12 to 36 or more hours after each coat. *Coverage:* 400 to 500 square feet per gallon. Scour with Silent Huntington* Floor Machine, using No. 2 or 3 steel wool or nylon fiber pad, between coats. If waxed floors are desired, apply two coats of Contrast Floor Polish after final coat of Seal-O-San is thoroughly dry. *Coverage:* approximately 2000 square feet per gallon.

Caution: Use *fresh* applicator pads to apply each coat of seal or else be sure the pads have been washed thoroughly in turpentine or mineral spirits. Also, if the seal has been allowed to remain in a partially empty container overnight or longer, strain it through a fine nylon mesh (like a woman's hose) to remove any foreign matter or congealed seal. This will decrease the occurrence of "pimples" on the floor when the seal is used.

THE PRODUCTS • ***Spal® Concentrate*** soapless detergent—see description under "Terrazzo Floors."

Seal-O-San® Gym Floor Finish sinks deeply into the porous cork, filling the cells. This makes the floor much more durable and keeps it attractive and useful longer. Seal-O-San Gym Floor Finish does not make cork floors noisy or hard. See additional description under "Wood Gym Floors."

Contrast® Floor Polish may be applied either directly on the cork or on the sealed surface. See additional description under "Concrete Floors."

CORK GYM FLOORS

THE PROBLEMS • **1.** *To assure a non-slippery, safe playing area.* **2.** *To preserve the beauty and color of cork and prevent the porous surface from absorbing stains.* **3.** *To protect the cork and provide a durable floor which is easy to maintain at low cost.*

THE SOLUTION TO THE PROBLEMS • Cork gym floors should be cleaned and sealed in the same manner as all other cork floors. *However, do not wax cork gym floors.*

SPECIFICATIONS ***New Floors:*** • Clean and seal in the same manner as cork tile and cork carpet floors. *Be sure that all factory-applied wax has been removed from the cork before applying the seal.* To assure this, *three* scrubbings with Spal Concentrate soapless detergent, including scouring with a Silent Huntington* Floor Machine, using a No. 1 steel wool or nylon fiber pad, are recommended. Also, wax may be removed by disc-sanding. *Or you may specify unwaxed tiles when ordering. Do not wax cork gym floors.*

THE PRODUCTS • ***Spal® Concentrate*** soapless detergent—see description under "Terrazzo Floors."

*Trade-mark, Huntington Laboratories, Inc. All products listed on the previous pages and above are manufactured by Huntington Laboratories, Inc., General Offices: Huntington, Indiana.

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Printed in U.S.A.

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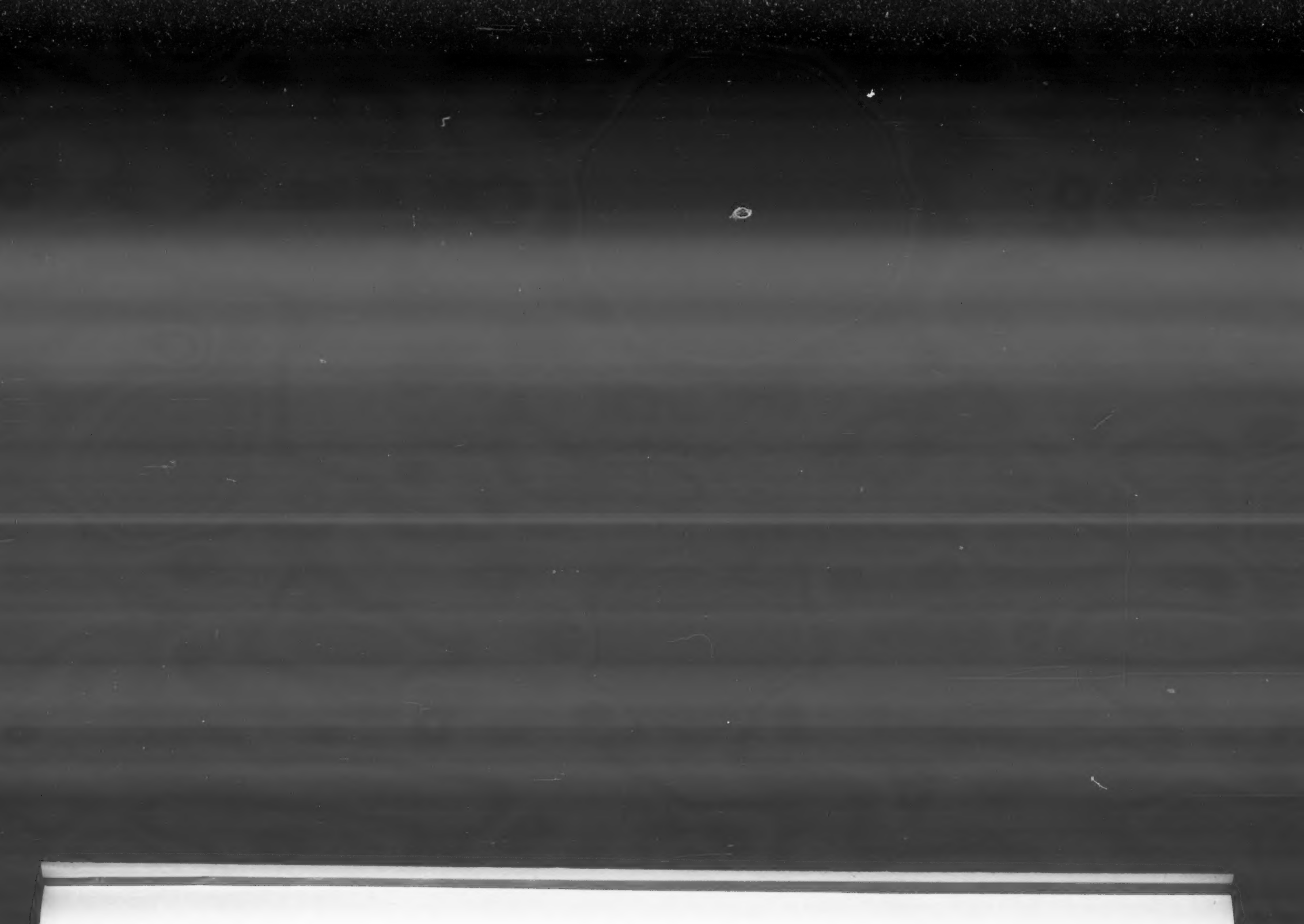
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